~~SECOND~~

ANNUAL CATALOGUE

— OF THE —

MONTANA COLLEGE

—OF—

AGRICULTURE

—AND—

MECHANIC ARTS,

BOZEMAN, = = MONTANA.

FOR THE ACADEMIC YEAR 1893-94

Bozeman:
Chronicle Print.
1894.

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Yerkes & Fell,
Book and Job Printers,
Bozeman, Montana.

INTRODUCTION.

The Montana College of Agriculture and Mechanic Arts owes its existence to an act of the Montana Legislature which met in 1893.

This institution will be supported by funds received from the United States government under the "Act of 1890 for the Further Endowment of Agricultural Colleges," from appropriations which may be made from time to time by the state legislature, and by funds which may be received from the sale of 140,000 acres of public land in the State of Montana, donated to the College by the United States government. The government appropriation provides that colleges of this class shall receive the sum of fifteen thousand ($15,000) dollars for the year ending June thirtieth, eighteen hundred and ninety, and an annual increase of such appropriation thereafter for ten years by an additional sum of one thousand ($1,000) dollars over the preceding year, and the annual amount to be paid thereafter to each state and territory "shall be twenty-five thousand ($25,000) dollars."

In connection with the College an Agricultural Experiment Station has been established. The object of this Station is to further the interests of the agricultural industries in the State of Montana. This is done by conducting researches and experiments which may include the physiology

of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of Montana as may seem advisable. For the support of this important department the United States government appropriates yearly the sum of fifteen thousand ($15,000) dollars.

The wording of the acts of congress appropriating land and funds for the maintenance of agricultural colleges clearly show that it was the intention of the framers to provide for courses in agriculture and such other branches as may be found to be most desirable for the particular state in which each college is located.

The Executive Board of Education of the Montana College of Agriculture and Mechanic Arts has therefore, with this aim in view, established courses of instruction in Agriculture, Applied Science, Business, a Ladies' Course, and also a Preparatory Department.

These courses have been carefully arranged with the view of furnishing, so far as is possible, such instruction as will be most beneficial to Montana students and to Montana interests in general, and it is believed that in one or the other of these courses the majority of the young men and the young women of the state will find a line of work suited to their tastes and abilities. The College not yet having buildings of its own, will occupy temporarily the Bozeman Academy building and some of the rooms in the new High

School building. These buildings are situated only a few hundred feet apart. Gallatin county and the City of Bozeman having generously presented the College with one hundred and eighty acres of land, which is well watered and but a short distance from the temporary College quarters, there will be no delay in commencing the practical farm work.

The College is indebted to Mr. Nelson Story, of Bozeman, for his generous gift of fifteen hundred dollars, made, during a period of financial panic, as payment for the land which is to be used as a site for the College buildings.

MONTANA STATE BOARD OF EDUCATION.

GOVERNOR J. E. RICKARDS (ex-officio).....Helena
ATTORNEY GENERAL H. J. HASKELL (ex-officio)..Helena
SUPT. OF PUB. INST. E. A. STEERE (ex-officio).....Helena
R. G. YOUNG.....Helena
NELSON STORY.....Bozeman
(Term expires February 1st, 1895.)
JAMES REID.....Bozeman
JOHN F. FORBIS.....Butte
(Term expires February 1st, 1896.)
J. E. MORSE.....Dillon
T. E. COLLINS.....Great Falls
(Term expires February 1st, 1897.)
J. M. HAMILTON.....Missoula
ALFRED MYERS.....Billings
(Term expires February 1st, 1898.)

OFFICERS OF THE BOARD.

J. E. RICKARDS,
President.

T. E. COLLINS,
Vice President.

E. A. STEERE,
Secretary.

F. W. WRIGHT,
Ex-officio Treasurer.

EXECUTIVE BOARD OF EDUCATION,

In Charge of the Agricultural College and the Experiment Station.

WALTER COOPER.....Bozeman
(Term expires February 1st, 1895.)

E. H. TALCOTT.....Livingston
(Term expires February 1st, 1895.)

GEO. KINKEL, JR.....Manhattan
(Term expires February 1st, 1896.)

LESTER S. WILLSON.....Bozeman
(Term expires February 1st, 1897.)

PETER KOCH.....Bozeman
(Term expires February 1st, 1898.)

OFFICERS OF THE BOARD.

LESTER S. WILLSON,
President.

GEO. KINKEL, JR.,
Vice President.

PETER KOCH,
Secretary and Treasurer.

FACULTY.

REV. JAMES REID, A. B., PRESIDENT,
Mental, Moral and Political Sciences.

A. M. RYON, E. M.,
Engineering and Mining.

S. M. EMERY,
Horticulture.

LUTHER FOSTER, M. S. A.,
Agriculture and Botany.

FRANK W, TRAPHAGEN, PH. D., F. C. S.,
Chemistry and Mineralogy.

R. E. CHANDLER, M. E.,
Mechanical Engineering and Mathematics.

W. L. WILLIAMS, V. S.,
Veterinary Science.

B. F. MAIDEN, B. A.,
English, and Principal of Preparatory Department.

H. G. PHELPS,
Business Department.

MISS KATE P. CALVIN,
Music.

*

Free Hand Drawing and Wood Carving.

W. M. COBLEIGH, E. M.,
Assistant in Chemistry and Physics.

MISS JENNIE JONES,
Assistant in the Business Department.

HILMA SUNDELL,
Assistant Librarian.

* To be supplied in the near future.

NOTE—Additional chairs will be created and supplied as the work of the Institution demands.

EXPERIMENT STATION STAFF.

S. M. Emery, Director,
Horticulturist.

Luther Foster,
Agriculturist.

F. W. Traphagen,
Chemist.

W. L. Williams, V. S.,
Veterinary Science.

A. M. Ryon,
Irrigation Engineer.

COURSE IN AGRICULTURE.

SOPHOMORE CLASS.

NAME.	ADDRESS.
Morgan, O. P. - - - -	Duncan.

FRESHMAN CLASS.

Blankenship, E. V. - - -	Bozeman.
Caldwell, Thos. - - -	Spring City, *Tenn.*
Crowley, M. H. - - -	Logan.
Cameron, Allan - - -	Belgrade.
Davis, Walter - - - -	"
Davis, Lester - - - -	"
Kruger, Louis - - - -	Bozeman.
McAdow, Perry - - -	"
O'Connell, Jas. - - - -	"
Sieh, Peter - - - -	"
Shay, Chas. A. - - -	"
Waters, Herman - - -	"
Willson, Frank - - -	"
Wright, Chas. - - - -	"

LADIES COURSE.

SOPHOMORE CLASS.

NAME.	ADDRESS.
Foster, Florence	Bozeman.
Gardner, Mattie	"
Lewis, Alice E.	"
Maxey, May	"
Stafford, Lucy	Pony.
Sundell, Hilma	Bozeman.
Shaw, Sadie	"

FRESHMAN CLASS.

Davis, Laura	Belgrade.
Hulbert, Lela	Bozeman.
Harper, Frankie	"
Koch, Hattie	"
Parkins, Hattie	Belgrade.
Stanton, Grace	Bozeman.
Staats, Carrie	"

COURSE IN APPLIED SCIENCE.

FRESHMAN CLASS.

NAME.	ADDRESS.
Chisholm, C. B. - - -	Bozeman.
McElroy, H. S. - - -	"
McKee, Thos. - - - -	Timberline.
Shaw, W. T. - - - -	Bozeman.
Sperling, Nathan - - -	"

SPECIALS.

NAME.	ADDRESS.
Cockrill, E. R. - - - -	Bozeman.
Emery, L. J. - - - - -	"
Ferris, Kate - - - - -	"
Hodges, Russie - - - -	"
Mills, Edward L. - - - -	"
Patterson, M. Nellie - - -	"
Pease, J. L. - - - - -	"
Penwell, Robert G. - - -	"
Penwell, Grace - - - -	"
Sales, Reno - - - - -	Salesville.
Shearer, C. T. - - - -	Bozeman.
Willson, Fred - - - -	"

BUSINESS COURSE.

BOOK KEEPING.

NAME.	ADDRESS.
Blankenship, Kate	Bozeman.
Black, Nellie	"
Colgan, T. L.	Poplar.
Dunn, Lizzie	Three Forks.
Dodsworth, Geo.	Jefferson Island.
Fitzgerald, Jas.	Bozeman.
Flaherty, E. B.	Cold Spring.
Jones, Jennie	Bozeman.
Lundwall, Chas.	"
Linnie, Chas.	"
Mallon, H. F.	Livingston.
Martin, R. E.	Bozeman.
McElroy, Hugh C.	"
Newkirk, Chas. J.	Whitehall.
Reese, Jos.	Bozeman.
Reese, O. L.	"
Reichman, Kate	Gallop.
Ruffner, Chas.	Bozeman.
Sales, Mary	Salesville.
Schabarker, Anna	Bozeman.
Sheridan, Kate	"
Thornton, Sadie	Ennis.
Thornton, Emmet	"
Tuttle, Arthur	Fish Creek.
Wade, Marvin	Bozeman.

SHORT HAND.

Buzard, W. A.	Gallatin, *Missouri.*
Black, Nellie	Bozeman.

Dunn, Lizzie	Three Forks.
Dunbar, Florence	Bozeman.
Fitzgerald, Jas.	"
Flaherty, E. B.	Cold Spring.
Gray, Harry B.	Nevada City, *Cal.*
Jones, Jennie	Bozeman.
Lundwall, Chas.	"
Mills, E. P.	Palestine, *Illinois.*
McElroy, Hugh C.	Bozeman.
Mackintosh, A. E.	Hillsdale.
Pease, E. A.	Bozeman.
Sales, Mary	Salesville.
Schabarker, Anna	Bozeman.
Schmalhausen, Beatrice	"
Schmalhausen, Anna	"
Spieth, Wm.	"
Street, Hattie	"
Sheridan, Kate	"
Thornton, Sadie	Ennis.
Thornton, Emmet	"
Thorp, Louis	Napoli, *New York.*
Van Tassell, Chas.	Bozeman.
Welliver, Bessie	Sappington.
Wise, Lulu	Bozeman.

PREPARATORY.

NAME.	ADDRESS.
Bishop, Arthur	Bozeman.
Boyles, Elliott	Salesville.
Boomer, Wilber	Bozeman.
Bull, May	Ennis.
Buell, Harry	Bozeman.
Cockrill, Irvin	Central Park.
Coulson, Harry	Bozeman.
Cowan, L. A.	"
Cameron, Chas.	Belgrade.
Christie, D. B.	Bozeman.
Dimock, Ella	"
Fallang, Oscar	Melville.
Foster, Oliver	Bozeman.
Gilmer, Lena	Ennis.
Hulbert, Pearl	Bozeman.
Hoppe, Albert	Cinnibar.
Howls, Jennie	Sappington.
Koch, Emil	Bozeman.
Martin, Jamie	"
Matthews, Alma	"
Morgan, Glenn	"
Marshall, Belle	"
McDonell, J. E.	"
Norman, Margaret	Spring Hill.
Pease, May	Bozeman.
Pease, Ethel	"
Pease, Roy	"
Penwell, Della	"
Rouse, Charles	"
Stucky, Lizzie	"

Snyder, Harry	Bozeman.
Snyder, Walter	"
Thomas, Isabel	Spring Hill.
Thompson, Edward	Logan.
Wolverton, Leslie	Bozeman.
White, Lily B.	"
Willson, Eugene*	"
Young, J. C.	Timberline.

*Deceased.

MUSIC DEPARTMENT.

PIANO.

NAME.	ADDRESS.
Buell, Mary	Bozeman.
Boyles, Elliott	Salesville.
Clothier, Olive	Bozeman.
Foster, Clara	"
Foster, Lutie	"
Fuller, Mrs. Belle	"
Foster, Beth	"
Foster, Florence	"
Hanson, Nina	"
Hoy, Katie	"
Long, Susie	Ennis.
Schmalhausen, Sadie	Bozeman.
Stanton, Grace	"
Staats, Carrie	"
Tracy, Frank	"
Turner, Mrs. Stella	"
Waters, Foley	"
Waters, Mary	"
Willson, Mrs. L. S.	"
Willson, Fred	"
Willson, Frank	"
Willson, Eugene*	"
Young, James	Timberline.

*Deceased.

MUSICAL HISTORY.

Foster, Florence	Bozeman.
Foster, Clara	"
Fuller, Mrs. Belle	"
Stanton, Grace	"
Staats, Carrie	"
Willson, Fred	"
Young, James	Timberline.

RECAPITULATION.

Agricultural Course—		
Sophomore Year	1	
Freshman Year	14	15
Ladies' Course—		
Sophomore Year	7	
Freshman Year	7	14
Applied Science Course—		
Freshman Year		5
Special College Students		12
Business Course—		
Book-keeping	25	
Shorthand and Type-writing	26	51
Preparatory Course		38
Music		30
Total		165
Repetition		26
True total		139

COURSE IN AGRICULTURE.

FRESHMAN YEAR.

FALL TERM—

Elementary Algebra	5
Grammar and Composition	5
Animal Anatomy or Freehand Drawing	5
Book-keeping.	

WINTER TERM—

Elementary Algebra	5
Rhetoric and Composition	5
Physics	5
Laboratory Physics (afternoons).	

SPRING TERM—

Elementary Algebra	5
Rhetoric	5
Physics	5
Breeds and Breeding.	
Freehand Drawing.	

SOPHOMORE YEAR.

FALL TERM—

Geometry	5
Literature	2
General History	3
Chemistry	5
Shops—Wood Work (afternoons).	

WINTER TERM—

Geometry	5
Literature and General History 5, or Animal Physiology	5
Chemistry	5
Laboratory (afternoons).	

SPRING TERM—

Literature and General History	5
Chemistry	5
Botany	5
Laboratory (afternoons), or Soils and Crops or Geometry.	

JUNIOR YEAR.

FALL TERM—

Zoology 5
Laboratory.
Botany 5
Literature and General History 5, or Animal Hygiene.
Shop—Metal Work (afternoons) optional.

WINTER TERM—

Human Physiology 5, or Veterinary Surgery 5
Literature and Civil Government 5, or Agricultural Chemistry.
Meteorology.

SPRING TERM—

Entomology 5
Horticulture and Landscape Gardening 5
History of Civilization and Literature 5 or Agricultural Chemistry.

SENIOR YEAR.

FALL TERM—

Horticulture 5, or Economics 5
Mineralogy 5
Principles of Feeding 5, or Logic 5
Irrigation Engineering.

WINTER TERM—

Psychology 5, or Veterinary Medicine 5
Geology 5
International Law 5, or Dairy Husbandry and Road Making 5

SPRING TERM—

Ethics.
Astronomy.
Thesis.

LADIES' COURSE.

FRESHMAN YEAR.

FALL TERM—

Elementary Algebra	5
Grammar and Composition	5
Book-keeping	5
Freehand Drawing.	

WINTER TERM—

Elementary Algebra	5
Composition and Rhetoric	5
Physics	5
Laboratory Physics (afternoons).	

SPRING TERM—

Elementary Algebra	5
Rhetoric	5
Physics	5
Freehand Drawing.	
Type-writing (optional).	
Wood Carving (optional).	

SOPHOMORE YEAR.

FALL TERM—

Geometry	5
Chemistry	5
Laboratory	5
General History	2
Literature	3
Type-writing (optional).	
Wood Carving (optional).	

WINTER TERM—

Geometry	5
General History	3
Literature	2
Chemistry	5
Labaratory (afternoons).	

SPRING TERM—

Literature	2
General History	3
Chemistry	5
Botany	5
Optional Laboratory.	
Window Gardening	2 lect.

JUNIOR YEAR.

FALL TERM—

Zoology	5
Laboratory	2
Botany	5
Literature	2
Political History	3

WINTER TERM—

Human Physiology	5
Literature	2
Civil Government	3
Meterology	5
Household Sanitation (from cellar to garret, care of sick, etc.)	2 lect.

SPRING TERM—

Entomology	5
History of Civilization	2
Literature	3
Landscape Gardening	2
Chemistry Foods	3 lect.

SENIOR YEAR.

FALL TERM—

Economics	5
Mineralogy	5
Logic	5

WINTER TERM—

Psychology	5
Geology	5
International Law	5
Social Ethics	2 lect.

SPRING TERM—

Ethics	5
Astronomy	5

Thesis.

Senior Receptions.

COURSE IN APPLIED SCIENCE.

For admission to this course a thorough knowledge of Arithmetic, including the Metric system, Algebra through Quadratic Equations, Geometry, United States History and English Grammar is required. Students deficient in any of the above requirements may enter on condition that they pass an examination on the subject in which they are deficient, before entering the second year.

CLASS ROOM STUDIES.

FIRST YEAR.	SECOND YEAR.	THIRD YEAR.	FOURTH YEAR.
Trigonometry. Analytics. General Chemistry. Qualitative Analysis. English. Descriptive Geometry. Higher Algebra.	Calculus. Chemical Physics. Chemical Philosophy. Physics. Quantitative Analysis. Civil Engineering. Mechanical Engineering.	Mechanics. Mineralogy. Stresses in Structures. Mining Engineering. Mechanical Engineering. Geology. Metallurgy.	Railroad Engineering. Lithology. Economic Geology. Stresses in Structures. Ore Dressing. Hydraulic Engineering. Applied Chemistry. Sanitary Engineering. Heating and Ventilation. Graphical Statics. Assaying.

PRACTICAL WORK.

Shops, optional with Qualitative Analysis. Mechanical Drawing.	Draughting and Shops, optional with Quantitative Analysis.	Mechanical Drawing. Surveying. Determinative Mineralogy.	Petrography. Railroad Surveying. Assaying. Graphical Statics. Engineering Designing.

AGRICULTURAL AND LADIES' COURSES.

AGRICULTURE.

PROF. LUTHER FOSTER.

BREEDS AND BREEDING.

In this department of the College, the student takes up during the Freshman year, a study of the most prominent breeds of domestic animals that have been introduced into the United States. Their origin, the history of their development, their characteristics, points of merit and defect, and their uses and adaptability to climate are treated, special attention being given to those breeds best suited to the wants of our own State. Curtis' treatise on "Horses, Cattle Sheep and Swine" is used as a basis for the work, and is supplemented by lectures and observations of the animals themselves among the different breeds as far as practical.

The principles of breeding, the laws of heredity, causes of variation, the formation of breeds, value of pedigree, atavism, crossing, the selection of breeding stock and many other topics relating directly to this important subject are considered.

STOCK FEEDING.

A portion of the Senior year is devoted to the Principles of Animal Feeding, in which the composition and requirements of animal bodies, the chemical composition of foods necessary to supply these wants, the general law of animal nutrition and the chemical action and values of the different kinds of foods are discussed. The German Standard rations

are given thorough study, special work being done in compounding Montana foods. The student figures out the nutritive ratios, showing in what proportions they may be used to make properly balanced rations for the different purposes of feeding, without the loss of more than a small per cent. of any of the nutrients. A consideration of the proper foods for each class of animals whether fed for labor, growth, milk or meat production is made prominent. The progress and results of the feeding experiments at the various Agricultural Experiment Stations are also carefully reviewed and discussed.

SOILS AND CROPS.

One term of the Sophomore year is given to the study of soils and fertilizers, the history and cultivation of the cereal crops, the value of a rotation of crops, and the most approved schemes of rotation, special and local crops, comparison of the different branches of Agriculture and the general subject of farm economy, including the structure, selection, use and care of farm tools and machinery.

ELECTIVES.

In addition to the above the following subjects are offered as electives in different terms of the course: Rural Economy and Law, Dairy Husbandry, Farm Equipment, and History of Agriculture, Road Engineering and Irrigation Engineering.

HORTICULTURE.

S. M. EMERY, DIRECTOR.

HORTICULTURE.

Instruction in Horticulture is given largely by practical operations in the nursery, garden and orchard, such as pruning, grafting, budding and making cuttings and layers.

The study of fruits includes the following topics: Methods of propagation, preparation of ground, cultivation and after treatment, winter protection, storage and marketing, hybridization and organization of new varieties, diseases and their remedies.

Vegetable are considered in the same general way. The history and peculiarities of individual varieties are studied and also the best methods employed in their cultivation. The aim is to cover all parts of the subject of Horticulture.

FORESTRY.

The consideration of this subject includes not only a study of various forest trees and their uses, but also the production and conservation of forest and forest conditions, the relations of forests and climate and the general topics of forestry legislation and economy. Instruction will be chiefly by lectures and the subject will be made as practical as possible.

LANDSCAPE GARDENING.

Two exercises per week are given in connection with forestry. The location of buildings, the laying out of grounds, the making of lawns and roads, the proper grouping and distribution of ornamental trees, shrubs and flowering plants and numerous kindred topics are included in the course.

NATURAL AND PHYSICAL SCIENCES.

PROF. LUTHER FOSTER.

DR. F. W. TRAPHAGEN.

BOTANY.

The study of this science is begun the last term of the Sophomore year. The morphology of flowering plants is studied from living specimens, of which a sufficient variety are taken to prepare the student for the use of Coulter's Manual. The object sought is to study plants, using books only as a guide. The course includes a thorough study of the physiology of flowering plants, with typical forms of the lower divisions of the vegetable kingdom. An herbarium of fifty species is required from each student. One term of Economic Botany, devoted to the study of those fungus growths which are injurious to Agriculture, is offered as an elective in the Junior year.

ZOOLOGY.

The following topics are presented through the aid of natural specimens, text books and lectures: Classification of animals as based on their structures and embryonic development; descriptive Zoology, comprising the systematic arrangement of animals according to natural relations and affinities; geographical distribution; habits; adaptations; perpetuation and improvement of varieties of animals. Zoology will be taught as far as possible by laboratory methods.

ENTOMOLOGY.

This study embraces the anatomy, transformation, habits, classification and geographical distribution of insects, illustrated by charts, drawings and dissections made by the students themselves. The student becomes familiar with

insect life, habits and transformations, by collecting, preserving and rearing specimens of our native species. Special attention is given to economic entomology, fostering beneficial and destroying noxious insects. Particular attention is given to species injurious to vegetation, their habits and the methods of checking their ravages.

CHEMISTRY, GEOLOGY, MINERALOGY AND PHYSICS.

Students in the Agricultural and Ladies' courses will receive instruction in the above named subjects in common with the students in the course of Applied Science, and further remarks will be found under these headings in the part of the catalogue devoted to the course of Applied Science.

METEOROLOGY.

The work in this branch is confined: First, to the study of the temperature, weight and motions of the atmosphere and the instruments and methods of measuring them; 2nd, to the study of precipitation and the relation of climate to Agriculture. A United States weather station will be maintained at the College, and daily telegraphic weather predictions will be received, as well as the Montana daily weather charts. These predictions and weather charts are studied by the class.

ASTRONOMY.

The course in astronomy aims to give not merely an application of Mathematics, but also a knowledge of the physical conditions of the universe, the laws which govern the motions of the celestial bodies and an insight into the methods by which the science has been brought to its present state.

VETERINARY SCIENCE.

PROF. W. L. WILLIAMS.

The instruction in Veterinary Science has been arranged with a view to fostering the important live stock interests of the State, encouraging the breeding and handling of better animals, and securing them as far as possible from disease.

The instruction, while not leading to a special degree in Veterinary Science, is similar in character, so far as it extends, to that prevailing in first-class veterinary schools and will afford excellent preparation to students expecting later to pursue the study of veterinary medicine and surgery.

Veterinary Anatomy occupying one term, will be taught in part by lectures illustrated by means of charts, skeletons, etc.; but mainly in the dissecting room where the various domestic animals and birds will be dissected and studied. Chauveau's Comparative Anatomy of Domestic Animals will be used as a reference book.

Animal Physiology (one term) will be taught largely by lectures, with Smith's Physiology of Domestic Animals as reference; the work being illustrated when possible by charts, apparatus, microscopical preparation, physiological experiments, etc.

Veterinary Hygiene extending over one term will be taught by lectures in part, and by text based on Smith's Veterinary Hygiene. The subjects of breeding, feeding, stabling and general management with a view to promoting health and avoiding disease will be thoroughly considered.

Students having pursued satisfactorily the foregoing studies may at their option devote one term to Veterinary Medicine and Surgery and one term to Veterinary Obstetrics, including the care and management of young and breeding animals.

Free clinics will be held once a week during the college year to which diseased animals may be brought for free treatment, the operations on such animals being performed

as far as possible by advanced students, under the immediate direction of the professor in charge.

Students will also have the privilege of seeing as far as possible cases occurring in the private practice of the Veterinarian. They will also be expected to see and aid in experiments with animal diseases at the Experiment Station. Books, journals, instruments, apparatus and animal skeletons ample for illustration and instruction, are provided.

HUMAN PHYSIOLOGY.

PROF. W. L. WILLIAMS.

Human Anatomy and Physiology is taught in the winter term of the Junior year in the Agricultural and Ladies' courses.

Instruction is given in part by lectures, partly by text with Martin's Human Body as a reference book. Lectures and text are illustrated as far as possible by dissections of animals in which the various organs most nearly resemble those of man, and by the use of the microscope for demonstrating the finer structure of tissues.

MATHEMATICS.

PROF. R. E. CHANDLER.

Students in the Agricultural and Ladies' courses will commence the study of Algebra at the beginning of the Freshman year. During the year they will complete the Algebra required, which will include simple and quadratic equations, radicals, and indeterminate equations. During the second year plane and solid geometry will be completed.

Students in these courses have the privilege of studying advanced Mathematics as laid down in the course of Applied Science.

SHOP WORK.

PROF. R. E. CHANDLER.

In the Agricultural course one term of practice in the shops is required, the second term being optional. The object is to familiarize the student with the use and care of tools and to give him some skill in ordinary work. All necessary tools will be furnished by the College but the students will be required to pay for the material used.

A well lighted room, 47 ft. by 41 ft., in the basement of the new Experiment Station Building has been set apart for use as an iron and wood-working shop, it will be ready for occupancy by the 15th of September, and will contain, three 16-inch screw cutting lathes, one 22-in. by 22-in. iron planer, one 20-inch drill press, three lathes for wood turning, one 15-horse power engine, one 20-horse power boiler, together with a complete outfit of hand tools both for iron and wood working.

DRAWING AND WOOD CARVING.

INSTRUCTOR, *.....

DRAWING.

Free-hand drawing is required during two terms of the Ladies' course. It is also offered as an elective for any who care to avail themselves of the opportunity.

WOOD CARVING.

This industrial study is offered as an elective during several terms of the course, but it must be preceded by a certain amount of free hand-drawing. The exercise is commended as especially valuable for training the hand and eye.

HISTORY, POLITICAL SCIENCE.

PRES. JAMES REID.

PROF. B. F. MAIDEN.

HISTORY.

This course has been extended to five full terms, the whole Sophomore year and two terms of the Junior year.

During the Sophomore year the course will embrace a comprehensive course in General History, i. e., an outline of society in ancient, mediæval and modern times. The class work, which will occupy but three periods per week, will be supplemented by assigned supplemented readings and thesis work. With a view to laying a broad, stable foundation upon which to base a careful and intelligent study of our own constitution and the various applications of government under it, one full term will be devoted to the study of the Constitutional History of England and the United States —this the fall term of the Junior year.

The History of Civilization occupies the third term of this year. Here the student is introduced to a comparative study which exhibits the contrasts between ancient and modern civilization, the variations in modern national development, the unity and relativity of important historical events and the causes and agencies of change and progress in European and American society.

POLITICAL ECONOMY.

This subject embraces a consideration of all the relations of capital and labor, by which citizens are directed in their industrial pursuits. The history and development of the science are presented, especially as related to our own country. All partisan teaching is avoided. Current practical problems in industrial society are discussed in the light of economic principles. It is also the aim of the instructor to awaken the interest of the students in the discussion of

sociology in its various aspects, and to aid them in the formation and expression of clear, sound and logical views; and to encourage them to think for themselves on all questions pertaining to individual enterprise and public prosperity.

CONSTITUTIONAL LAW.

This subject embraces in a comprehensive manner a discussion of the principles involved in the government of the state, county, city and town organizations, as well as those involved in the government of the United States. As every citizen takes part more directly in the local than in the general government, he needs to understand the power and relations of the state and municipal governments. An endeavor is also made to show not only WHAT our free institutions are, but WHY they exist, by tracing their development from the beginning of the English Constitution through the Colonial and revolutionary periods of our own country's history. The qualifications of an elector and the general rights and duties of the citizen are also touched upon.

ENGLISH STUDIES.

PROF. B. F. MAIDEN.

The aim in this department is to secure accurate, vigorous and graceful expression; to teach what good literature is, and how to study it. The work is distributed as follows:

COMPOSITION.

This study is pursued during the first term of the Freshman year. It comprises thorough drills in the use of punctuation marks and capitals, and in sentence and paragraph structure. Numerous exercises in paraphrase and reproduction will lead the student up to original composition.

RHETORIC.

The study of Rhetoric occupies the second and third term

of the Freshman year. The design of this course is to cultivate a critical taste in the use of language and in the study of literature, and also to afford constant exercise in composition work. Literary style is carefully analyzed, and extensive selections from standard authors, illustrative of the various qualities and elements, are studied critically. Four original essays are required in connection with this work.

LITERATURE.

The first two terms of the Sophomore year will be devoted to a critical study of American authors. Here the principles of Rhetoric are applied to literary criticism. The style, subject, matter and personality of the author are examined and each student is required to investigate independently along some line of criticism assigned to him. The results of his investigation are embodied in a thesis which is read before the class. One thesis each term is required.

A study of the History of the English Language together with readings from American authors will occupy the spring term of the Sophomore year.

A general outline of English literature with readings from eight or ten of the best English classics from Spenser to Tennyson will occupy two periods per week of the Junior year.

In all literary studies accurate and scholarly methods are encouraged. The adequacy and beauty of thought, its range and variety are best secured by practical reading. The student is led to recognize the spirit rather than the letter, to determine correctly the author's thought and feeling.

The study of the essentials of literature, the life back of the form, secures a literary method best adapted to knowledge, discipline and culture. Literature is thus made a study of mind and character and the forms of art.

Suggestion is also given to guide the student in selecting and pursuing a helpful course of collateral reading, that valuable time and energy may not be dissipated in indiscriminate reading.

MENTAL AND MORAL SCIENCE.

PRES. JAMES REID.

The work in this department, necessarily confined to the Senior year, aims to introduce the student to an acquaintance with the nomenclature, definitions, methods, great problems and aims of philosophical study. The transition by the young student from studies mainly objective, as is the greater part of the cirriculum, to studies chiefly reflective and subjective, is often to the average student a difficult and unwelcome experience. Any course of preliminary instruction, therefore, calculated to smooth the way for this transition by familiarizing the student's thought with the terms, definitions, method and easier problems, must be as valuable as welcome to the student. Suitable elementary texts in Logic, Psychology and Ethics will be chosen to perform this important office, supplemented by a course of lectures especially prepared as an introduction to a more comprehensive study of Philosophy.

LOGIC.

The work in this "science of sciences" will occupy the first term of the Senior year. Of the interest and value of the study of Logic both as a mental gymnastic and as a special training of the faculties for the discovery of truth and the detection of error, nothing need be urged.

Our method of instruction includes thorough study of the text book and a practical application of the principles of Logic to the student's habits of thinking and expression, and to the detection of logical fallacies in examples chosen from standard literature.

PSYCHOLOGY.

Two full terms are devoted to this study. Careful attention will be given to the double aspect of this science, approaching it from the standpoints of consciousness and

physiology. Class discussion and debate on the many interesting and practical questions that constantly present themselves in pursuing this study will be encouraged, and thesis work assigned to develop such questions more fully.

ETHICS.

During the last term of the senior year a course of lectures will be given on the Nature of Volition and Human Responsibility, and two lessons per week in some standard text, as Dr. Robinson's Theory and Practice of Morals.

DEPARTMENT WORK
IN THE
COURSE OF APPLIED SCIENCE.

ENGINEERING.

PROF. A. M. RYON.

CIVIL ENGINEERING.

Instruction in Civil Engineering will extend through the second, third and fourth years.

During the second year attention will be directed to the following subjects: First, Materials—building stone, limes, cements, mortar, concrete, wood, metals, paints and varnishes. Second, Masonry—its construction, retaining walls, arches, chimneys, fonndations above and below water. Third, Framing—wooden structures and carpentry. Fourth, Bridges—stone, wooden and cast iron, arched, trussed, tubular, suspension, movable and aqueduct bridges. Fifth, Common Road Construction—methods for laying out roads, determination of proper grades and preparation of road surfaces, construction of canals, general principles governing the improvement of rivers, harbors and shores in general.

The line of work indicated above will be carried on partly with the aid of text books and partly by lectures.

During the third and fourth years the students will study the methods used for determining the stresses which given loads will impose upon arches, trusses, pillars, etc. They will also consider the resistance of materials, and be given

in this connection many practical problems to solve. Hydraulic Engineering, including water supply, reservoirs and dams, will be taken up during the fourth year.

SANITARY ENGINEERING.

Lectures will be given on house drainage, sewers, land drainage, heating and ventilation.

MINING ENGINEERING.

During the third year lectures will be given on the methods of mining the various classes of deposits which occur in nature. The topics considered will be somewhat as follows: Prospecting, exploratory workings, comparison of the methods of opening up a deposit, timbering, sinking and drifting in quicksand, tunneling, methods of exploitation, drift running, hydraulic mining, driven wells, boring in rock, drainage of mines, underground and surface transportation, ventilation, blasting and quarrying, methods of paying miners, keeping accounts and stocking mines.

During the fourth year students are requested to hand to the Professor a memoir which will contain an accurate account of visits made to mines during the preceding vacation. The memoir must be illustrated by drawings made to scale of the various mine appliances used at the properties visited. These memoirs become the property of the Engineering Department, and are kept for reference purposes.

During the fourth year a course of lectures will be given on Ore Dressing, including general principles, preliminary cleansing and sizing, screens, concentration by jigs, buddles, tables, etc.; also on the mechanical preparation of coal.

ENGINEERING DESIGN.

This work will be carried on in the Drawing Room during the fourth year, and consists in the preparation of designs for mine pumps, bridges, roof trusses, cranes, etc. Efforts will be made to submit such problems to the student as will give him practice in applying the theoretical knowledge which he has acquired during the previous years.

SURVEYING.

Instruction in the theory of surveying will be given during the third and fourth years; practical work in the field will be carried on during the fall of the third and fourth years, and will include pacing, chaining, ranging with poles, reading compass bearings, compass survey, adjustment and use of the hand level, topographical surveys with hand level, adjustments of the transit, exercise in reading of angles with the transit, determination of the true meridian by an observation on polaris with the transit, and also with the solar attachment, traverse with the transit and steel tape, adjustment of the telemeter wires and measurement of distances by telemeter and gradienter, azimuth traverse with telemeter and gradienter measurements, city survey, adjustment of the wye level, line of levels run with wye level and Phila. rod, railroad surveying and earthwork calculation.

Lectures will also be given on the use of the plane table, solar compass and solar attachment for the transit.

MECHANICAL ENGINEERING AND MECHANICAL DRAWING.

PROF. R. E. CHANDLER.

Under the head of boilers will be considered the materials used in their construction, the relative advantages and disadvantages of such materials, methods of construction, strength and tests of boilers, different types of boilers, heaters and economizers, safety apparatus, regulators, incrustation and corrosion, care of boilers, etc.

Lectures will be given on the general principles of mechanism and prime movers which will include the general theory of motion, valve gearing, types and construction of

machinery in practice, steam engines, hot air engines, and water wheels.

Students may elect to take shop work and additional work in the draughting room in place of analytical chemistry.

In mechanical drawing during the first year students will be given practice in the use of instruments. The plates will include work in geometrical drawing, perspective, and detail drawings of machine parts.

During the third year students will be engaged in the drawing room working out practical problems in descriptive geometry, shades and shadows, machine design, topographical work, etc.

GENERAL CHEMISTRY.

DR. F. W. TRAPHAGEN.

Chemistry, inorganic and organic, occupies the entire first year and is developed with especial reference to the periodic law. As success in the more advanced work depends so closely upon a mastery of the principles of the science, we aim to attain that end. Attention is directed during the year to the relations of the elements and their compounds and to their properties and uses. The preparation of the various metals and useful compounds for the market is dwelt upon, and later in the course special attention is given them under the subjects of Chemical Technology, Metallurgy, etc.

Courses of lectures, supplemented by text-book work wherever possible, and references to current literature, are given on the following subjects.

CHEMICAL PHYSICS.

Under this head the physical methods for determining the

constitution of chemical compounds and chemical changes are studied. Attention is especially directed to the chemical effects of light, heat, electricity, etc.

CHEMICAL PHILOSOPHY.

The work of this branch consists chiefly in the solution of numerous problems, including volume of gases, calculation of the proportions of chemicals necessary in various practical operations, etc.

CHEMICAL TECHNOLOGY.

Chemical Technology will be taught by lectures with illustrations of processes, by use of charts, models, samples of crude materials and also of intermediate and finished products. Wagner's Chemical Technology will be used for constant reference by the students. The subjects will be divided as follows:

First.—Technology of Fuel. Including Thermometry, Determination of Value of Fuels, Charcoal, Peat, Lignite, Coal, Coke, Heating Arrangements, Gas, Mineral Oil, Paraffin and Solar Oil, Lighting, Photometry, Candles, Lamps. Gas Lighting, Electric Light.

Second.—Metallurgy in Its Relations with Chemistry. Including those metals of economic importance.

Third.—Chemical Manufacturing Industry. Including Water and Ice, Artificial Mineral Waters, Sulphur, Sulphuric Acid, Potassium and Sodium Salts, Chlorine, Bromine and Iodine, Nitric Acid, Explosives, Ammonia, Phosphorous, Matches, Phosphates, Manures, Boric Acid, Compounds of the Metals having industrial applications, Ultramarine and other inorganic pigments, Thermochemistry.

Fourth.—Organic Chemical Manufactures. Including Alcohols, Ethers, Organic Acids, Coal Tar, Organic Coloring Matters, Tar Colors, Banzol Colors, etc.

Fifth.—Glass Manufacture. Ceramic, Mortars and Cements.

Sixth.—Articles of Food and Consumption. Including Starch and Dextrine, Sugar, Wine, Beer, Spirits, Flour and

Bread, Milk, Butter and Cheese, Meat, Nutrition, effects of various kinds of diet.

Seventh.—Chemical Technology of Fibres. Including Wool, Silk, Vegetable Fibres, Bleaching, Dyeing and Tissue Printing, Paper Manufacture.

Eighth.—Miscellaneous Organs, Chemical Arts and Manufactures. Including Tanning, Glue, Size and Gelatine, Bones, Fats, Soap, Essential Oils and Resins, Preservation of Wood.

PRACTICAL CHEMISTRY.

DR. F. W. TRAPHAGEN.

A preliminary course in laboratory practice is given the student to familiarize him with the preparation and properties of the more common reagents before any actual work in chemical analysis is begun. The entire course is steadily progressive, the student proving, so far as possible, the truth of each fact as he masters it.

QUALITATIVE ANALYSIS.

The elements are separated into groups by the student and their action with various reagents carefully studied. Tables of resemblance are prepared and the reactions taking place in every test are expected to be fully understood and noted by the proper symbols. After a similar study of the acids the student determines the metal and acid of unknown salts and when proficient in this proceeds to the separation and identification of the constituents of unknown complex mixtures.

QUANTITATIVE ANALYSIS.

Salts of known composition are first analyzed and after accuracy is established, more complex natural and artificial

compounds are submitted. The samples are chosen with especial reference to the requirements of the students in the various courses, the Agricultural students devoting themselves to the analysis of soils, fertilizers, grains, milk, butter, fodder, etc.; while the students in Applied Science analyze ores, furnace products, etc. While accuracy is the principal object and gravimetric methods generally used, whenever speed can be attained without impairing the results, shorter methods will be given. Colorimetric and volumetric methods will be carefully taught and the student thoroughly grounded in the underlying principles of each method.

ASSAYING.

DR. F. W, TRAPHAGEN.

The situation of our College makes a thorough course in Assaying one of the most important needs and to meet it we have secured a set of samples and apparatus and have outlined a course of work which will fully meet all requirements. We shall be able to reproduce all the conditions of the mill or commercial assay office and to give a thoroughly practical course. Before completing the course the student is given a practical series of samples, representing the daily work of the assayer of a mill or smelter, and will be required to return accurate results within the time usually occupied by the commercial assayer.

METALLURGY.

Current American and foreign methods for the economic production of the metals, either by smelting, lixiviation, electrolysis, or other methods, will be the subject of a series of lectures and recitations during which will be considered also refractory materials, furnaces, effects of impurities and methods of eliminating the same.

Special attention will be given to the different methods for calculating furnace charges for the production of slags with definite chemical compositions, and many variations of ore will be assumed.

MINERALOGY.

Lectures upon Mineralogy are given and the attention of the student is drawn to the characteristics of each of the minerals whose identification is required, its resemblance to other minerals and its differences. These lectures deal with all those properties which can be distinguished without apparatus, the chemical composition and tests being only incidentally treated. Later, in Determinative Mineralogy, the unknown mineral is given and by the application of the chemical tests of blowpipe analysis and his knowledge of theoretical Mineralogy and of Crystallography, the student determines the minerals.

The specimens used in this course consist of a large collection illustrating the minerals of economic importance and their associates. The students also have access to the very extensive private collections of the Professor of Mineralogy,

CRYSTALLOGRAPHY.

Crystallography is taught by aid of a set of models which illustrate the more important crystalline forms and their modifications. They cover all the forms of which a knowledge is necessary for the student of Mineralogy, and the student becomes thoroughly familiar with each of them.

BLOWPIPE ANALYSIS.

As a means of determining the composition of minerals and as a convenient method of analyzing, Blowpipe Analysis receives close attention. Bead, flame, coal and special reactions are carefully taught so that with his blowpipe and small set of reagents the student is able to determine the composition of any compound.

PHYSICS.

The possible applications of a knowledge of Physics are

so varied and its principle are so generally used in every department of scientific research that every effort will be made to impart to the students as thorough an understanding of the subject as is possible in the time which can be given to it.

It is our aim so far as practicable to illustrate the principles by laboratory experiments, and a fine selection of apparatus is available for students' use in this work.

GEOLOGY.

PROF. *.....

Lectures in connection with Le Conte's Elements of Geology occupy the entire year. The work is divided into Physical, Structural and Historical Geology, and includes practice in the identification of the age of rocks by fossils, statigraphical work in the field, and identification of the crystalline rocks by microscopic examination.

ECONOMIC GEOLOGY.

Economic Geology is treated by lectures under the followiug general headings:

1. Ore Deposits.
2. Coals, Petroleum and Natural Gas.
3. Building Stone.
4. Abrasive Materials.
5. Natural Salts.
6. Gems.
7. Limes, Cement and Artificial Stone.
8. Pigments.
9. Water.
10. Phosphates.
11. Clays used for Pottery, Porcelain, etc.
12. Sands for Glass.
13. Miscellaneous topics.

ENGLISH.

PROF. B. F. MAIDEN.

Students in the course of Applied Science will be required to take a course of study in English which will extend throughout the Freshman year.

MATHEMATICS.

PROF. A. M. RYON.

PROF. R. E. CHANDLER.

Students in the course of Applied Science must be prepared to commence the study of Plane and Spherical Trigonometry. Higher Algebra and Analytical Geometry will be completed during the Freshman year. Differential and Integral Calculus and Mechanics will be taken up during the Sophomore and Junior years.

A thorough knowledge of these branches will be necessary in order that the student may be prepared to study intelligently the Applied Mathematics which come later in the Engineering Department work.

DESCRIPTIVE GEOMETRY.

During the first year recitations will be held in Descriptive Geometry three times a week throughout the year. The work in the Draughting Rooms during the third and fourth years will afford the student opportunities for applying practically the principles acquired in the class room.

PREPARATORY DEPARTMENT.

PROF. B. F. MAIDEN.

A Preparatory course of one year is provided for those not sufficiently advanced in the common branches to regularly enter the courses in Agriculture, Domestic Economy or Business.

Students should be at least fourteen years of age, and competent to pass an examination in Arithmetic through Denominate Numbers; should possess a fair knowledge of English Grammar and Geography, and be able to read and write well.

TO PARENTS AND STUDENTS.

It is highly important that students should enter at the commencement of the fall term.

Those entering later must adapt themselves to classes started at the first of the term.

COURSE OF STUDY.

FALL TERM.	WINTER TERM.
Arithmetic,	Arithmetic,
English Grammar,	English Grammar,
Geography,	Physical Geography,
Orthography,	United States History.

SPRING TERM.

Elementary Algebra.	English Grammar,
Physiology,	United States History.

Spelling lessons throughout the year.

The requirements for entrance to the course of Applied Science will be found on the schedule of studies of that course, in another part of the catalogue.

BUSINESS DEPARTMENT.

COURSE IN BOOK-KEEPING.

PROF. H. G. PHELPS.

REQUIREMENTS FOR ENTRANCE.

Those wishing to enter this course are required to pass an examination in the following: English Grammar and Composition, Harvey's Grammar or an equivalent; Arithmetic, including Common and Decimal Fractions, Denominate Numbers, Percentage, and Equation of Accounts.

WORK REQUIRED.

The work as laid out will occupy the students' entire time and attention.

FALL TERM.	WINTER TERM.
Book-keeping.	Book-keeping.
Penmanship.	Penmanship.
Business Law.	Business Letter Writing.
Rapid Calculations.	Rapid Calculations.
Spelling.	Spelling.
Examination.	Examination.

SPRING TERM.

Practical Miscellany. Business Practice. Examination.

The work in Book-keeping is as follows:

1.—Simple Accounts. 2.—Short Sets. 3.—Advanced Sets. 4.—Complete Sets. At the close of each set, the students are required to pass an examination before beginning the next.

PENMANSHIP.

During the fall and winter terms, the student receives instruction in plain writing; one period each day is given to this work. Two kinds of lettering for box marking and ledger headings are also given in connection with plain writing.

BUSINESS LAW.

A modern text book is used, and is supplemented by lectures. Access may be had to reference books in the library.

BUSINESS LETTER WRITING.

The old method of lecturing to the class is abandoned and a suitable book is placed in the student's hands. The subject is made very interesting from the fact that the student does the actual work. Many letters are written and criticised by the class.

PRACTICAL MISCELLANY.

This supplementary work is given for a period of four weeks, and includes Complex Partnership Settlements; changing single proprietorships to partnerships; Opening Books under peculiar circumstances; changing partnerships to Limited Stock Companies, Joint Stock Companies and Corporations; and changing Joint Stock Companies to Consolidated Companies.

BUSINESS PRACTICE.

Business Practice includes buying and selling of merchandise, real estate, etc., and keeping books in the Merchants' Emporium, Commercial Exchange, and Banking offices.

Expenses for books in this course will be about $10. This amount includes stationery also.

COURSE IN SHORT-HAND AND TYPE-WRITING.

WORK REQUIRED.

FALL TERM.	WINTER TERM.
Manual of Short-hand.	Reporter's Companion.
Business Law.	Correspondence.
Type-writing.	Type-writing.
Spelling.	Spelling.
Examinations.	Dictation.
	Examinations.

SPRING TERM.

Business Letters. Phrase Book. Type-writing.
Dictation. Examination.

Before entering the course, candidates will be required to pass an examination in the same branches as those for Book-keeping.

Students will be required to write seventy-five words per minute in Short-hand, and transcribe the same matter correctly on the Type-writer before graduation.

The books for this course will cost about $5.50.

DEPARTMENT OF MUSIC.

MISS KATE CALVIN.

INSTRUMENTAL.

In this course special attention is given to thorough technique, and correct interpretation with practical analysis of rhythm and form.

Selections from the following course in Piano will be given according to the ability of the students:

Instruction in Theory and History of Music will be free to all members of the Piano Department.

Jadassohn and Emery's Harmony will be used, and those wishing to take a complete course in Piano must pass examination in Harmony.

Frequent recitals will be given by the students for the purpose of acquiring confidence in playing at public concerts. Pupils will also receive special training in memorizing and sight-reading.

COURSE OF STUDY.

First Year—Fundamental Technique; selections from the five finger exercises of Louis Kohler. Melodious Exercises. Enckhausen, Book I Duvernoy op. 176 Book 2 and 3. Czerny's Studies revised by Germer Book I, Part I. Selection from Easier Sonatines and Sonatas of Clementi, Kuhlau, Mozart and Haydn.

Second Year—Daily Technique; Czerny, Germer Studies, Book 1 and 2: Major and Minor Scales. Heller op. 47, Book 2; Felix Le Couppey, op. 20 and op. 26; Loeschorn's School of Velocity, Book 1 and 2. 12 Kleine Praludien Bach. Miscellaneous classics from Mozart, Haydn, Beethoven, Schumann and Mendelssohn.

Third Year—Daily Technique, German Studies Book 2

School of Velocity Loeschorn Books 2 and 3; Two Voice Inventions J. S. Bach Concertos Mozart Easier ones of Beethoven. Miscellaneous Classics Sonatas of Hummel Nocturins—Nos. 3 and 5 Field: Selections by Bach, Mozart, Handel, Beethoven, Schubert, Mendelssohn, Schumann, Chopin, also from Grieg, Godard, Scharwenkas, Paderewski and other modern composers.

Fourth Year—Daily Technique Studies—Moscheles op. 70; op. 25. Cramer op. 84 Czerno's Virtuoso School, Book 1 op. 365 Fugues by Bach Czerny's School for the Left Hand op. 718 Gradus by Clementi Concertos, Mendelssohn and Beethoven Miscellaneous Classics; also selections from modern composers.

MILITARY SCIENCE.

The College is entitled to the detail of a U. S. army officer and when such detail is made instruction will be given in Military Science and Tactics. The Government also supplies the College with arms, ammunition and tents.

The value of military training for improving the habits, manners and health of students can hardly be overestimated, and a general knowledge of military matters is highly to be desired in every community.

The Military Tactics and Drill will occupy about three hours weekly and not interfere with the student's regular work.

ADMISSION.

Candidates for any class are examined in the studies of the lower classes. Students presenting certificates of proficiency from reputable schools or colleges may be admitted without examination in the branches specified in the certificate, providing they obtain the consent of the faculty.

ATTENDANCE.

Prompt attendance at all recitations, lectures and regular exercises of the College is required of every student.

Students whose absences exceed five per cent of the total number of recitations or lectures, in any subject, will not be allowed to take the regular examinations in that subject without first presenting a satisfactory excuse to the faculty.

EXAMINATIONS.

Frequent examinations are required of every student so that the standing of each student may be readily ascertained at any time.

Reports are mailed to parents at the end of each term.

ELECTIVE STUDIES.

A certain amount of latitude in selecting studies will be allowed to special students, although any departure from the regular prescribed courses will be discouraged as a rule. Students desiring to take special courses must first obtain the consent of the faculty.

DEGREES.

Suitable degrees and certificates will be conferred on graduates from all courses.

GOVERNMENT.

Students will be expected to conduct themselves as ladies and gentlemen; those who fail to comply with this demand will be requested to leave the institution.

EQUIPMENT.

The College has a small but carefully selected library at present and will add to it every year.

The shops for wood and iron work will be equipped with suitable machinery during the present summer and be ready for occupancy when College opens in the fall.

The chemical and physical laboratories are thoroughly supplied with proper apparatus and chemicals for carrying on the work of those departments.

The veterinary department has been furnished with skeletons and instruments for carrying on dissecting work.

The engineering department has an ample supply of surveying and other instruments, including apparatus for the measurement of water.

About $500 has been spent for supplying the department of Botany with the necessary presses, microscopes, etc.

The College has started mineral and fossil collection, which include several of the World's Fair exhibits, among them the famous Anaconda exhibit. These collections will be added to from year to year.

The Experiment Farm has been supplied with improved farm machinery and the students will be afforded an opportunity to study the various makes of machines and their use.

EXPENSES.

Preparatory, or any College Course, per year	$10.00
Physical Apparatus (deposit)	5.00
Qualitative Apparatus (deposit)	15.00
Quantitative Apparatus (deposit)	25.00
Blowpipe Apparatus (deposit)	10.00
Assaying Apparatus (deposit)	15.00
Mineralogy, including Apparatus and 100 Minerals	10.00

A sufficient charge will also be made to cover the cost of chemical and physical apparatus used by the students in the laboratories.

At the end of the term the student may return such apparatus as has not been damaged and receive in return the balance of his deposit due him. This ought to amount to less than 50 per cent. of the original deposit.

Ordinary chemicals are furnished by the College free.

Town students entering the Preparatory course will be charged a fee of $25 per year, instead of $10, as given above, so long as they continue in that course. They may, however, enter the College courses on payment of the regular fee of $10 per year.

DEPARTMENT OF MUSIC.

Fall Term—One lesson per week on Piano	$14.00
Winter Term—One lesson per week on Piano	12.00
Spring Term—One lesson per week on Piano	10.00
Total	$36.00
Fall Term—Two lessons per week on Piano	$25.20
Winter Term—Two lessons per week on Piano	21.60
Spring Term—Two lessons per week on Piano	18.00
Total	$64.80

HARMONY.

Class lessons, $5.00 for the entire academic year.

Board and lodging may be obtained in town for $4.00 per week and upward.

PAYMENT OF FEES.

All fees must be paid in advance. Students will not be permitted to enter classes until their fees are paid.

CALENDAR.

College Opens.....September 19, 1894
Examinations.....December 20 and 21
Vacation Begins.....December 22
Winter Term Commences.....January 7, 1895
Examinations.....March 28 and 29
Spring Term Begins.....April 1
Examinations.....June 3 and 4
Summer Vacation.....June 8 to September 18

All legal holidays will be observed.

THIRD

ANNUAL CATALOGUE

—OF THE—

MONTANA COLLEGE

—OF—

AGRICULTURE

—AND—

MECHANIC ARTS,

BOZEMAN, = = MONTANA.

FOR THE ACADEMIC YEAR 1894-95

AND ANNOUNCEMENTS

FOR 1895-96.

Bozeman:
Chronicle Print.
1895.

CALENDAR.

1895—96..

1895.

Monday, Sept. 16, } Examinations for Entrance and
Tuesday, Sept. 17, } Conditions.

Wednesday, Sept. 18, Fall term begins.

Tuesday, Oct. 15, Short course in Agriculture begins.

Thursday, Dec. 19, } Term Examinations.
Friday, Dec. 20, }

Saturday, Dec. 21, Christmas Holidays begin.

1896.

Monday, Jan. 6, Winter term begins.

Wednesday, March 18, Short course in Agriculture ends.

Monday, March 30, } Term Examinations.
Tuesday, March 31, }

Wednesday, Apr. 1, Spring term begins.

Thursday, June 4, } Final Examinations.
Friday, June 5, }

Sunday, June 7, Baccalaureate Day.

Monday, June 8, Field Day.

Tuesday, June 9, Lecture before Literary Society.

Wednesday, June 10, Annual Concert.

Thursday, June 11, Undergraduate Exhibition.

Friday, June 12, Commencement Day.

June 13 to Sept. 16, Summer Vacation.

INTRODUCTION.

The Montana College of Agriculture and Mechanic Arts owes its existence to an act of the Montana Legislature which met in 1893.

This institution will be supported by funds received from the United States government under the "Act of 1890 for the Further Endowment of Agricultural Colleges," from appropriations which may be made from time to time by the state legislature, and by funds which may be received from the sale of 140,000 acres of public land in the State of Montana, donated to the College by the United States government. The government appropriation provides that colleges of this class shall receive the sum of fifteen thousand ($15,000) dollars for the year ending June thirtieth, eighteen hundred and ninety, and an annual increase of such appropriation thereafter for ten years by an additional sum of one thousand (1,000) dollars over the preceding year, and the annual amount to be paid thereafter to each state and territory "shall be twenty-five thousand ($25,000) dollars."

In connection with the College, an Agricultural Experiment Station has been established. The object of this Station is to further the interests of the agricultural industries in the State of Montana. This is done by conducting researches and experiments which may include the physiology

of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of Montana as may seem advisable. For the support of this important department the United States government appropriates yearly the sum of fifteen thousand ($15,000) dollars.

The wording of the acts of congress appropriating land and funds for the maintenance of agricultural colleges clearly shows that it was the intention of the framers to provide for courses in agriculture and such other branches as may be found to be most desirable for the particular state in which each college is located.

The Executive Board and Faculty of the Montana College of Agriculture and Mechanic Arts have therefore, with this aim in view, established courses of instruction in Agriculture, Applied Science, Business, a Ladies' Course, and also a Preparatory Department.

These courses have been carefully arranged with the view of furnishing, so far as is possible, such instruction as will be most beneficial to Montana students and to Montana interests in general, and it is believed that in one or the other of these courses the majority of the young men and the young women of the state will find a line of work suited to their tastes and abilities. The College not yet having buildings of its own, will occupy temporarily the Bozeman Academy building and some of the rooms in the new High

School building. These buildings are situated only a few hundred feet apart. Gallatin county and the City of Bozeman having generously presented the College with one hundred and eighty acres of land, which is well watered and but a short distance from the temporary College quarters, there will be no delay in commencing the practical farm work.

The College is indebted to Mr. Nelson Story, of Bozeman, for his generous gift of fifteen hundred dollars, made, during a period of financial panic, as payment for the land which is to be used as a site for the College buildings.

MONTANA STATE BOARD OF EDUCATION.

GOVERNOR J. E. RICKARDS (ex-officio).....Helena
ATTORNEY GENERAL H. J. HASKELL (ex-officio).....Helena
SUPT. OF PUB. INST. E. A. STEERE (ex-officio).....Helena
R. G. YOUNG.....Helena
H. H. GRANT.....Grantsdale
(Term expires February 1st, 1899.)
JAMES REID.....Bozeman
(Term expires February 1st, 1896.)
J. E. MORSE.....Dillon
T. E. COLLINS.....Great Falls
(Term expires February 1st, 1897.)
J. M. HAMILTON.....Missoula
A. L. GODDARD.....Billings
(Term expires February 1st, 1898.)

OFFICERS OF THE BOARD.

J. E. RICKARDS,
President.

T. E. COLLINS,
Vice President.

E. A. STEERE,
Secretary.

F. W. WRIGHT,
Ex-officio Treasurer.

EXECUTIVE BOARD.

In Charge of the Agricultural College and the Experiment Station.

GEO. KINKEL, JR.....Manhattan
(Term expires February 1st, 1896.)
LESTER S. WILLSON.....Bozeman
(Term expires February 1st, 1897.)
PETER KOCH.....Bozeman
(Term expires February 1st, 1898.)
NELSON STORY.....Bozeman
(Term expires February 1st, 1899.)
WALTER COOPER.....Bozeman
(Term expires February 1st, 1900.)

OFFICERS OF THE BOARD.

LESTER S. WILLSON,
President.

GEO. KINKEL, JR.,
Vice President.

PETER KOCH,
Secretary and Treasurer.

FACULTY.

REV. JAMES REID, A. B., PRESIDENT,
Mental, Moral and Political Sciences.
A. M. RYON, E. M.,
Engineering and Mining.
S. M. EMERY,
Horticulture.
LUTHER FOSTER, M. S. A.,
Agriculture and Botany.
FRANK W. TRAPHAGEN, PH. D., F. C. S.,
Chemistry and Mineralogy.
R. E. CHANDLER, M. E.,
Mechanical Engineering and Mathematics.
W. L. WILLIAMS, V. S.,
Veterinary Science.

*

Zoology, Biology, Entomology.
B. F. MAIDEN, B. A.,
English, and Principal of Preparatory Department.
MISS M. A. CANTWELL,
Assistant, Preparatory Department.

*

Instructor in Domestic Economy.

* To be Supplied.

NOTE—Additional chairs will be created and supplied as the work of the Institution demands.

H. G. PHELPS,
Business Department.
MISS KATE P. CALVIN.
Piano.
PROF. ALBERT WRIGHT,
Violin.
MRS. F. E. MARSHALL,
Art Department.
W. M. COBLEIGH, E. M,,
Assistant in Chemistry and Physics.
MISS JENNIE JONES.
Assistant in the Business Department.
MISS SADIE SHAW,
Assistant Librarian.

EXPERIMENT STATION STAFF.

S. M. Emery, Director,
Horticulturist.

Luther Foster,
Agriculturist.

F. W. Traphagen,
Chemist.

W. L. Williams, V. S.,
Veterinary Science.

A. M. Ryon,
Irrigation Engineer.

COURSE IN AGRICULTURE.

JUNIOR CLASS.

NAME.	ADDRESS.
Morgan, Oliver P. - - -	Duncan.

SOPHOMORE CLASS.

Blankenship. E. V. - - -	Bozeman.
Caldwell, Thos. O. - - -	Spring City, *Tenn.*
Cameron, Allen - - - -	Belgrade.
Flaherty, Edward B. - - -	Pipestone Springs.
Sieh, Peter - - - - -	Belgrade.

FRESHMAN CLASS.

Bishop, Arthur J, - - -	Bozeman.
Boyles, Elliott - - - -	"
Cockrill, Irvin - - - -	"
Cowan, Luke A. - - -	"
Dell, Ada - - - - -	"
Foster, Oliver E. - - -	"
Henderson, Claude - - -	"
Maxey, George - - - -	"
Pattee, John E. - - - -	Three Forks.
Sharman, Samuel - - -	Logan.
Shaw, Howard - - - -	Bozeman.
Wisner, J. K. - - - -	"
Wolverton, Leslie - - -	"

LADIES' COURSE.

JUNIOR CLASS.

NAME.	ADDRESS.
Foster, Florence J. - - -	Bozeman.

SOPHOMORE CLASS.

Koch, Hattie - - - -	Bozeman.
Robinson, Edna - - -	"
Shaw; Sadie - - - -	"
Stafford, Lucy - - - -	"

FRESHMAN CLASS.

Pease. May - - - -	Bozeman.
Stuckey, Helen - - - -	"
Stuckey, Lizzie - - - -	"

COURSE IN APPLIED SCIENCE.

FRESHMAN CLASS.

NAME.	ADDRESS.
Chisholm, C. B. - - - -	Bozeman.
✓ McKee, T. ~~H~~ - - - -	Timberline.
Sales, Reno - - - - -	Salesville.
Young, James C. - - -	Timberline.

SPECIALS.

NAME.	ADERESS.
Cowan, Jennie - - - -	Bozeman.
Cox, Mrs Alice - - - -	Jefferson Island.
Flowers, John P. - - -	Bozeman.
Ferris, Kate - - - -	"
Jones, Jennie - - - -	"
Kay, John M. - - - -	"
Patterson, Nellie M. - - -	"
Shaw, W. T. - - - -	"
Sieber, Mrs. E. T. - - -	Rapids.
Staats, Carrie - - - -	Bozeman.
Stanton, Grace - - - -	"
Waters, Herman B. - - -	"
Willson, Fred - - - -	"

PREPARATORY DEPARTMENT.

NAME.	ADDRESS.
Austin, Hattie	Bozeman.
Blakeley, Sallie A.	"
Boomer, Wilbert J.	"
Buell, Harry	"
Dawson, John E.	Cold Spring.
Davis, Lester	Belgrade.
Fallang, Oscar	Melville.
Foster, Carrie	Bozeman.
Harding, Ada	Spring Hill.
Hulbert, Pearl	Bozeman.
Hyde, Sarah C.	Hyde.
Isaac Frank H.	Rancher.
Jones, Edgar B.	Myersburg.
Jones, Wyatt W.	"
Kent, Seymour	Bozeman.
Kennedy, Rose	Belgrade.
Kuntz, John	Bozeman.
Llewellyn, John D.	"
Lyon, Edward	Lyon.
Martin, James	Bozeman.
Marshall, Belle	"
Maynard, Edna A.	Ennis.
Michner, Laura	Salesville.
Moore, Ellie J.	Belgrade.
Morgan, Joseph	Duncan.
Morgan, Albert	"
Murray, Anna	Bozeman.
Murphy, Anna	Belgrade.
McElroy, H. C.	Bozeman.
Noble, Hattie	Jefferson Island.

Peel, Martin - - - -	Ennis.
Reese, Oliver L. - - - -	Bozeman.
Robinson, Lester - - -	"
Rouse, Charles - - - -	"
Sappington, Tyrie L. - -	Sappington.
Schabarker, W. W. - - -	Bozeman.
Sievert, Otto - - - -	"
Simons, Will - - - -	Spring Hill.
Spain, Virgie - - - -	Belgrade.
Thomas, Bess I. - - - -	Logan.
Van Doren, Halsey, - - -	Myersburg.
White, Lily B. - - - -	Bozeman.
Willson, Frank - - - -	"
Winters, Mary J. - - -	"
Wright, Charles J. - - -	"
Wylie, Fred - - - -	"

BUSINESS COURSE.

BOOK-KEEPING.

NAME.	ADDRESS.
Bailey, John	Bozeman.
Chavey, Geo.	"
Crowley, William	Logan.
Davis, Walter	Belgrade.
Ferguson, Ollie	Bozeman.
Gottschalck, Annie	"
Hansen, Retta E.	Pony.
Isaac, Lena	Rancher.
Jay, May	Pony.
Krueger, Albert	Bozeman.
Metzell, Louis A.	Puller Springs.
Mitchell, H. H.	Ennis.
Oakwood, Lottie	Bozeman.
Reichman, Kate	Sedan.
Ruffner, Chas.	Bozeman.
Robinson, Leonora	"
Story, Thos. B.	"
Sheridan, Kate	"
Thornton, Emmett	Ennis.
Vestal, Ora	Big Timber.
Welsh, Alice	Bozeman.

SHORT-HAND AND TYPE-WRITING.

Fitzgerald, James J.	Bozeman.
Imes, Nellie	"
Lundwall, Chas.	"
Sales, Mary	Salesville.
Street, Hattie	Bozeman.

MUSIC.

PIANO.

NAME.	ADDRESS.
Boyles, Elliott	Bozeman.
Brown, Edith	"
Buell, Mary	"
Chisholm, Chas. B.	"
Chisholm, Perry	"
Ellis, Alma	"
Fell, Ada	"
Foster, Florence	"
Foster, Clara	"
Foster, Lulu	"
Foster, Beth	"
Foster, Mabel	"
Gardner, Carrie	"
Hanson, Nina	"
Hogan, Mrs. Rose	"
Hoy, Kate	"
Kirschner, Mrs. Laura	"
Luce, Gertrude	"
Martin, James	"
Martin, Julia	"
Martin, Horace	"
McElroy, Sadie	"
Patterson, Marian	"
Rich, Olive	"
Robinson, Leonora	"
Robinson, Edna	"
Schmalhausen, Sadie	"
Staats, Carrie	"

Stanton, Grace - - - "
Stanton, Belle - - - - "
Story, Byron - - - - "
Taylor, Louis - - - - "
Tracy, Frank - - - - "
Traphagen, Gertrude - - "
Turner, Mrs. Stella - - "
Van Allen, Janet - - - "
Waters, Mary - - - - "
Waters, Foley - - - - "
Willson, Fred - - - - "
Willson, Frank - - - "
Wylie, Grace - - - - "
Yerkes, Beulah - - - - "

RECAPITULATION.

Agricultural Course—		
Junior Year	1	
Sophomore Year	5	
Freshman Year	13	
		19
Ladies' Course—		
Junior Year	1	
Sophomore Year	4	
Freshman Year	3	
		8
Applied Science Course—		
Freshman Year	4	
Specials	13	
		17
Preparatory Course	46	
Business Course	21	
Short-Hand and Type-Writing	5	
		72
Music		42
Total		158
Repetition		10
True Total		148

COLLEGE COURSES.

COURSE IN AGRICULTURE.

FIRST YEAR.

Fall Term—	
Geometry	5
Algebra (Optional)	5
Rhetoric	5
Animal Anatomy 5, or Latin	5
Free Hand Drawing.	
Winter Term—	
Rhetoric and Elementary Logic	5
Geometry	5
Dairy Husbandry 5, or Latin	5
Free Hand Drawing	5
Spring Term—	
Geometry (Optional)	5
Rhetoric and Elementary Logic	5
Botany	5
Breeds and Breeding 5, or Latin	5
Wood Carving or other Art work.	

SECOND YEAR.

Fall Term—	
General History	3
American Literature	2
General Chemistry	5
Botany 5, or Latin	5
Shops (Wood).	
Winter Term—	
General History	3
Literature	2
Chemistry	5
Animal Physiology 5, or Latin	5
Laboratory Work.	

SPRING TERM—

General History	3
Literature	2
Book-Keeping	5
Chemistry 5, or Latin	5

JUNIOR YEAR.

FALL TERM—

Meteorology 3, Hydraulics	2
Zoology	5
Constitutional History 3, and Literature 2, or Animal Hygiene	5
Shops (Iron).	

WINTER TERM—

Human Physiology	5
Or Veterinary Science	5
Civil Government 3, and Literature	2
Or Agricultural Chemistry	5
Hydraulics (Optional)	2
Physics-Laboratory.	

SPRING TERM—

Entomology	5
Landscape Gardening	2
History of Economics	3
Literature	2
Agricultural Chemistry	5
Or Hydraulics 2, and Irrigation Eng.	3

SENIOR YEAR.

Fall Term—

Horticulture 5, or Economics	5
Principles of Feeding 5 or Logic	5
Geology	5
Mineralogy (Afternoons)	3

WINTER TERM—

Veterinary Medicine	5
Or Psychology	5
Geology	5
International Law	5
Or Soils and Crops and Road Making	5

Spring Term—

Ethics	5
Astronomy	5
Thesis.	

LADIES' COURSE.

FIRST YEAR.

FALL TERM—

Algebra	5
Rhetoric	5
Domestic Economy 5, or Latin	5
Free Hand Drawing	5

WINTER TERM—

Geometry	5
Home Dairying5, or Latin	5
Rhetoric and Elementary Logic	5
Free Hand Drawing	5

SPRING TERM—

Geometry	5
Rhetoric and Elementary Logic	5
Botany	5
Latin (Optional)	5
Wood Carving or other Art work	5

SECOND YEAR.

FALL TERM—

General History	3
American Literature	2
General Chemistry	5
Botany 5, or Latin	5

WINTER TERM—

General History	3
Literature	2
Chemistry	5
Domestic Economy 5, or Latin	5
Laboratory Work.	

SPRING TERM—

General History	3
Literature	2
Book-Keeping	5
Chemistry 5, or Latin	5
Window Gardening	
Laboratory Work	

JUNIOR YEAR.

FALL TERM—

Meteorology	3
Zoology	5
Constitutional History 3, and Literature	2

WINTER TERM—

Human Physiology	5
Civil Government	5
Literature	2
Meteorology	5
Household Sanitation, two lectures.	

SPRING TERM—

Entomology	5
Landscape Gardening	2
History of Economics 3, Literature	2
Chemistry of Foods, three lectures.	

SENIOR YEAR.

FALL TERM—

Economics	5
Mineralogy (Afternoons)	3
Logic	5
Geology	5

WINTER TERM—

Psychology	5
Geology	5
International Law	5

SPRING TERM—

Ethics	5
Astronomy	5
Thesis.	

SHORT COURSE IN AGRICULTURE.

FIRST YEAR.

FALL TERM—

Arithmetic.
Grammar.
Penmanship.
Reading and Spelling.
Animal Anatomy and Physiology.
Dairy Husbandry.

WINTER TERM—

Arithmetic.
Grammar.
Penmanship.
Reading and Spelling.
Animal Hygiene.
Small Fruits and Orcharding.
Shop Work.

SECOND YEAR.

FALL TERM—

English Composition.
Elementary Physics.
Diseases of Farm Animals.
General Agriculture.
Farm Accounts.

WINTER TERM—

Elementary Chemistry.
Elementary Botany.
Irrigation.
Gardening and Forest Tree Planting.
Animal Feeding.
Shop Work.

Lectures on agricultural topics will be given throughout the course, and will be illustrated as far as possible.

All subjects in the short agricultural course will be made elective so as to give the utmost freedom to those who enter it.

The course will extend over two years of two terms each.

The first term will begin on the 15th of October and end with the beginning of the Christmas holidays.

The second term will begin immediately after the holidays and end the middle of March.

COURSE IN APPLIED SCIENCE.

For admission to this course, a thorough knowledge of Arithmetic, including the Metric system, Algebra through Quadratic Equations, Geometry, Elementary Physics and Chemistry, United States History and English Grammar is required. Students deficient in any of the above requirements may enter on condition that they pass an examination on the subject in which they are deficient, before entering the second year.

CLASS ROOM STUDIES.

FIRST YEAR.	SECOND YEAR.	THIRD YEAR.	FOURTH YEAR.
Trigonometry. Analytics. General Chemistry. Qualitative Analysis. Theory. English. Descriptive Geometry. Higher Algebra.	Calculus. Chemical Philosophy. Civil Engineering. Mechanical Engineering. General History and Literature. Quantitative Analysis (Optional).	Mechanics. Physics. Mineralogy. Stresses in Structures. Mining Engineering. Mechanical Engineering. Geology. Metallurgy.	Railroad Engineering. Lithology. Economic Geology. Stresses in Structures. Ore Dressing. Hydraulic Engineering. Applied Chemistry. Sanitary Engineering. Heating and Ventilation. Graphical Statics. Assaying.

PRACTICAL WORK.

Shops, Qualitative Analysis. Mechanical Drawing.	Draghting and Shops, optional with Quantitative Analysis.	Mechanical Drawing. Surveying. Determinative Mineralogy.	Railroad Surveying. Assaying. Graphical Statics. Engineering Designing.

AGRICULTURAL AND LADIES' COURSES.

AGRICULTURE.

PROF. LUTHER FOSTER.

BREEDS AND BREEDING.

In this department of the College, the student takes up during the Freshman year, a study of the most prominent breeds of domestic animals that have been introduced into the United States. Their origin, the history of their development, their characteristics, points of merit and defect, and their uses and adaptability to climate are treated, special attention being given to those breeds best suited to the wants of our own State. Curtis' treatise on "Horses, Cattle Sheep and Swine" is used as a basis for the work, and is supplemented by lectures and observations of the animals themselves among the different breeds as far as practical.

The principles of breeding, the laws of heredity, causes of variation, the formation of breeds, value of pedigree, atavism, crossing, the selection of breeding stock and many other topics relating directtly to this important subject are considered.

STOCK FEEDING.

A portion of the Senior year is devoted to the Principles of Animal Feeding, in which the composition and requirements of animal bodies, the chemical composition of foods necessary to supply these wants, the general law of animal nutrition and the chemical action and values of the different kinds of food are discussed. The German Standard rations

are given thorough study, special work being done in compounding Montana foods. The student figures out the nutritive ratios, showing in what proportions they may be used to make properly balanced rations for the different purposes of feeding, without the loss of more than a small per cent. of any of the nutrients. A consideration of the proper foods for each class of animals, whether fed for labor, growth, milk or meat production, is made prominent. The progress and results of the feeding experiments at the various Agricultural Experiment Stations are also carefully reviewed and discussed.

SOILS AND CROPS.

One term of the Sophomore year is given to the study of soils and fertilizers, the history and cultivation of the cereal crops, the value of a rotation of crops, and the most approved schemes of rotation, special and local crops, comparison of the different branches of Agriculture and the general subject of farm economy, including the structure, selection, use and care of farm tools and machinery.

ELECTIVES.

In addition to the above the following subjects are offered as electives in different terms of the course: Rural Economy and Law, Dairy Husbandry, Farm Equipment, and History of Agriculture, Road Engineering and Irrigation Engineering.

HORTICULTURE.

S. M. EMERY, DIRECTOR.

HORTICULTURE.

Instruction in Horticulture is given largely by practical operations in the nursery, garden and orchard, such as pruning, grafting, budding and making cuttings and layers.

The study of fruits includes the following topics: Methods of propagation, preparation of ground, cultivation and after treatment, winter protection, storage and marketing, hybridization and organization of new varieties, diseases and their remedies.

Vegetables are considered in the same general way. The history and peculiarities of individual varieties are studied and also the best methods employed in their cultivation. The aim is to cover all parts of the subject of Horticulture.

FORESTRY.

The consideration of this subject includes not only a study of various forest trees and their uses, but also the production and conservation of forest and forest conditions, the relations of forests and climate and the general topics of forestry legislation and economy. Instruction will be chiefly by lectures and the subject will be made as practical as possible.

LANDSCAPE GARDENING.

Two exercises per week are given in connection with forestry. The location of buildings, the laying out of grounds, the making of lawns and roads, the proper grouping and distribution of ornamental trees, shrubs and flowering plants and numerous kindred topics are included in the course.

NATURAL AND PHYSICAL SCIENCES.

PROF. LUTHER FOSTER.

BOTANY.

The study of this science is begun the last term of the Freshman year. The morphology of flowering plants is studied from living specimens, of which a sufficient variety are taken to prepare the student for the use of Coulter's Manual. The object sought is to study plants, using books only as a guide. The course includes a thorough study of the physiology of flowering plants, with typical forms of the lower divisions of the vegetable kingdom. An herbarium of fifty species is required from each student. One term of Economic Botany, devoted to the study of those fungus growths which are injurious to Agriculture, is offered as an elective in the Junior year.

ZOOLOGY.

PROF. W. L. WILLIAMS.

The subject of Zoology is begun in the [illegible] is taught chiefly by laboratory methods.

Students are expected to study with the microscope the smaller forms of animal life and the more minute parts of larger animals.

Abundant fresh and alcoholic specimens are supplied for dissection and study, to intelligently illustrate the classification of animals, as based upon their structure and development.

The laboratory and text book work is supplemented by

HUMAN PHYSIOLOGY.

The elements of Human Physiology are studied in the the Preparatory Course.

Human Anatomy and Physiology is taught in the winter term of the Junior year in the Agricultural and Ladies' courses.

Instruction is given in part by lectures and partly by text with Martin's Human Body as a reference book. Lectures and text are illustrated as far as possible by the human skeleton; by dissections of animals in which the various organs most nearly resemble those of man, and by the use of the microscope for demonstrating the finer structure of the various tissues.

of climate to Agriculture.

will be maintained at the College, and daily telegraphic weather predictions will be received, as well as the Montana daily weather charts. These predictions and weather charts are studied by the class.

ASTRONOMY.

The course in astronomy aims to give not merely an application of Mathematics, but also a knowledge of the physical condition of the universe, the laws which govern the motions of the celestial bodies and an insight into the methods by which the science has been brought to its present state.

VETERINARY SCIENCE.

PROF. W. L. WILLIAMS.

The instruction in Veterinary Science has been arranged with a view to fostering the important live stock interests of the State, encouraging the breeding and handling of better animals, and securing them as far as possible from disease.

The instruction, while not leading to a special degree in Veterinary Science, is similar in character, so far as it extends, to that prevailing in first-class veterinary schools and will afford excellent preparation to students expecting later to pursue the study of veterinary medicine and surgery.

Veterinary Anatomy, occupying one term, will be taught in part by lectures illustrated by means of charts and skeletons; but mainly in the dissecting room where the various domestic animals and birds will be dissected and studied. Chauveau's Comparative Anatomy of Domestic Animals will be used as a reference book.

Animal Physiology (one term) will be taught largely by lectures, with Smith's Physiology of Domestic Animals as reference; the work being illustrated by charts, apparatus, microscopical preparations, physiological experiments, etc.

Veterinary Hygiene, extending over one term, will be taught by lectures in part, and by text based on Smith's Veterinary Hygiene. The subjects of breeding, feeding, stabling and general management, with a view to promoting health and avoiding disease, will be thoroughly considered.

Students having pursued satisfactorily the foregoing

studies may at their option devote one term to Veterinary Medicine and Surgery, and one term to Veterinary Obstetrics, including the care and management of young and breeding animals.

As soon as practicable clinics will be held during the college year, to which diseased animals may be brought for free treatment; the operations on such animals being performed as far as possible by advanced students, under the immediate direction of the professor in charge.

Students will also have the privilege of seeing as far as may be convenient, cases occurring in the private practice of the veterinarian. They will also be expected to see and aid in experiments with animal diseases at the Experiment Station. Books, journals, instruments, apparatus and animal skeletons, ample for illustration and instruction, are provided.

MATHEMATICS.

PROF. R. E. CHANDLER.

Students in the Agricultural and Ladies' courses will commence the study of Algebra at the beginning of the Freshman year. During the year they will complete the Algebra required, which will include simple and quadratic equations, radicals, and indeterminate equations. During the second year plane and solid geometry will be completed.

Students in these courses have the privilege of studying advanced Mathematics as laid down in the course of Applied Science.

SHOP WORK.

PROF. R. E. CHANDLER.

In the Agricultural course one term of practice in the shops is required, the second term being optional. The object is to familiarize the student with the use and care of tools and to give him some skill in ordinary work. All necessary tools will be furnished by the College but the students will be required to pay for the material used.

A well lighted room, 47 ft. by 41 ft., in the basement of the new Experiment Station building has been set apart for use as an iron and wood-working shop, and will contain three 16-inch screw cutting lathes, one 22-inch by 22-inch iron planer, one 20-inch drill press, three lathes for wood turning, one 15-horse power engine, one 20-horse power boiler, together with a complete outfit of hand tools both for iron and wood working.

One term of shop work is required of all students in the Applied Science course. During the Sophomore year students may elect extra shop work and draughting instead of quantitative analysis.

ART DEPARTMENT.

MRS. F. E. MARSHALL.

Work in this department is required during the three terms of the Freshman year, both in the Agricultural and Ladies' course.

The plan of study includes technical instruction in drawing from the round, perspective, plane geometry, industrial

design and decorative work, clay modelling and wood carving, with painting in oil and water-color.

Lectures are given on historic architecture and ornament, and the history of ancient and modern art.

The aim of the entire course will be to give the student a solid foundation for future work, whether as artist or artisan.

HISTORY, POLITICAL SCIENCE.

PRES. JAMES REID.

PROF. B. F. MAIDEN.

HISTORY.

This course has been extended to five full terms, the whole Sophomore year and two terms of the Junior year.

During the Sophomore year the course will embrace a comprehensive course in General History, i. e., an outline of society in ancient, mediæval and modern times. The class work, which will occupy but tnree periods per week, will be supplemented by assigned supplemented readings and thesis work. With a view to laying a broad, stable foundation upon which to base a careful and intelligent study of our own constitution and the various applications of government under it, one full term will be devoted to the study of the Constitutional History of England and the United States —this the fall term of the Junior year.

The History of Economics occupies the third term of the Junior year. This study of the rise and development of economic theories is especially valuable. First, it presents the leading facts of mediæval and modern history as viewed from a new standpoint—that of the economist—thus giving the student a better comprehension of History as a whole. And again, it affords a natural and helpful introduction to the theory of Economics and Sociology which is taken up in the Senior year.

POLITICAL ECONOMY.

This subject embraces a consideration of all the relations of capital and labor, by which citizens are directed in their

industrial pursuits. All partisan teaching is avoided. Current practical problems in industrial society are discussed in the light of economic principles. It is also the aim of the instructor to awaken the interest of the students in the discussion of sociology in its various aspects, and to aid them in the formation and expression of clear, sound and logical views; and to encourage them to think for themselves on all questions pertaining to individual enterprise and public prosperity.

CONSTITUTIONAL LAW.

This subject embraces in a comprehensive manner, a discussion of the principles involved in the government of the state, county, city and town organizations, as well as those involved in the government of the United States. As every citizen takes part more directly in the local than in the general government, he needs to understand the power and relations of the state and municipal governments. An endeavor is also made to show not only WHAT our free institutions are, but WHY they exist, by tracing their development from the beginning of the English Constitution through the Colonial and revolutionary periods of our own country's history. The qualifications of an elector and the general rights and duties of the citizen are also touched upon.

ENGLISH STUDIES.

PROF. B. F. MAIDEN.

The aim in this department is to secure accurate, vigorous and graceful expression; to teach what good literature is, and how to study it. The work is distributed as follows:

RHETORIC.

The study of Rhetoric occupies the first term and is continued three recitations per week throughout the second and third terms of the Freshman year. The design of this course

is to cultivate a critical taste in the use of language and in the study of literature, and also to afford constant exercise in composition work. Literary style is carefully analyzed, and extensive selections from standard authors, illustrative of the various qualities and elements, are studied critically. Four original essays are required in connection with this work.

LITERATURE.

The first two terms of the Sopomore year will be devoted to a critical study of American authors. Here the principles of Rhetoric are applied to literary criticism. The style, subject matter, and personality of the author are examined, and each student is required to investigate independently along some line of criticism assigned to him. The results of his investigation are embodied in a thesis which is read before the class. One thesis each term is required.

A study of the History of the English Language, together with readings from American authors, will occupy the spring term of the Sophomore year.

A general outline of English literature, with readings from eight or ten of the best English classics, from Spenser to Tennyson, will occupy two periods per week of the Junior year.

In all literary studies accurate and scholarly methods are encouraged. The adequacy and beauty of thought, its range and variety, are best secured by practical reading. The student is led to recognize the spirit rather than the letter, to determine correctly the author's thought and feeling.

The study of the essentials of literature, the life back of the form, secures a literary method best adapted to knowledge, discipline and culture. Literature is thus made a study of mind and character and the forms of art.

Suggestion is also given to guide the student in selecting and pursuing a helpful course of collateral reading, that valuable time and energy may not be dissipated in indiscriminate reading.

MENTAL AND MORAL SCIENCE.

PRES. JAMES REID.

The work in this department, necessarily confined to the Senior year, aims to introduce the student to an acquaintance with the nomenclature, definitions, methods, great problems and aims of philosophical study. The transition by the young student from studies mainly objective, as is the greater part of the curriculum, to studies chiefly reflective and subjective, is often to the average student a difficult and unwelcome experience. Any course of preliminary instruction, therefore, calculated to smooth the way for this transition by familiarizing the student's thought with the terms, definitions, method and easier problems, must be as valuable as welcome to the student. Suitable elementary texts in Logic, Psychology and Ethics will be chosen to perform this important office, supplemented by a course of lectures especially prepared as an introduction to a more comprehensive study of Philosopy.

LOGIC.

The work in this subject will occupy a part of the winter term in the Freshman year and the first term of the Senior year. Of the value of the study of Logic both as a mental gymnastic and as a special training of the faculties for the discovery of truth and the detection of error, nothing need be urged.

Our method of instruction includes thorough study of the text book and a practical application of the principles of Logic to the student's habits of thinking and expression, and

to the detection of logical fallacies in examples chosen from standard literature.

PSYCHOLOGY.

Two full terms are devoted to this study. Careful attention will be given to the double aspect of this science, approaching it from the standpoints of consciousness and physiology. Class discussion and debate on the many interesting and practical questions that constantly present themselves in pursuing this study will be encouraged, and thesis work assigned to develop such questions more fully.

ETHICS.

During the last term of the Senior year a course of lectures will be given on the Nature of Volition and Human Responsibility, and two lessons per week in some standard text.

DEPARTMENT WORK
IN THE
COURSE OF APPLIED SCIENCE.

ENGINEERING.

PROF. A. M. RYON.

CIVIL ENGINEERING.

Instruction in Civil Engineering will extend through the second, third and fourth years.

During the second year attention will be directed to the following subjects: First, Materials—building stone, limes, cements, mortar, concrete, wood, metals, paints and varnishes. Second, Masonry—its construction, retaining walls, arches, chimneys, foundations above and below water. Third, Framing—wooden structures and carpentry. Fourth, Bridges—stone, wooden and cast iron, arched, trussed, tubular, suspension, movable and aqueduct bridges. Fifth, Common Road Construction—methods for laying out roads, determination of proper grades and preparation of road surfaces, construction of canals, general principles governing the improvement of rivers, harbors and shores in general.

The line of work indicated above will be carried on partly with the aid of text books and partly by lectures.

During the third and fourth years the students will study the methods used for determining the stresses which given loads will impose upon arches, trusses, pillars, etc. They

will also consider the resistance of materials, and be given in this connection many practical problems to solve. Hydraulic Engineering, including water supply, reservoirs and dams, will be taken up during the fourth year.

SANITARY ENGINEERING.

Lectures will be given on house drainage, sewers, land drainage, heating and ventilation.

MINING ENGINEERING.

During the third year lectures will be given on the methods of mining the various classes of deposits which occur in nature. The topics considered will be somewhat as follows: Prospecting, exploratory workings, comparison of the methods of opening up a deposit, timbering, sinking and drifting in quicksand, tunneling, methods of exploitation, drift running, hydraulic mining, driven wells, boring in rock, drainage of mines, underground and surface transportation, ventilation, blasting and quarrying, methods of paying miners, keeping accounts and stocking mines.

During the fourth year students are requested to hand to the Professor a memoir which will contain an accurate account of visits made to mines during the preceding vacation. The memoir must be illustrated by drawings made to scale of the various mine appliances used at the properties visited. These memoirs become the property of the Engineering Department, and are kept for reference purposes.

During the fourth year a course of lectures will be given on Ore Dressing, including general principles, preliminary cleansing and sizing, screens, concentration by jigs, buddles, tables, etc.; also on the mechanical preparation of coal.

ENGINEERING DESIGN.

This work will be carried on in the Drawing Room during the fourth year, and consists in the preparation of designs for mine pumps, bridges, roof trusses, cranes, etc. Efforts will be made to submit such problems to the student as will give him practice in applying the theoretical knowledge which he has acquired during the previous years.

SURVEYING.

Instruction in the theory of surveying will be given during the third and fourth years; practical work in the field will be carried on during the fall of the third and fourth years, and will include pacing, chaining, ranging with poles, reading compass bearings, compass survey, adjustment and use of the hand level, topographical surveys with hand level, adjustment of the transit, exercise in reading of angles with the transit, determination of the true meridian by an observation on polaris with the transit, and also with the solar attachment, traverse with the transit and steel tape, adjustment of the telemeter wires and measurement of distances by telemeter and gradienter, azimuth traverse with telemeter and gradienter measurements, city survey, adjustment of the wye level, line of levels run with wye level and Phila. rod, railroad surveying and earthwork calculation.

Lectures will also be given on the use of the plane table, solar compass and solar attachment for the transit.

MECHANICAL ENGINEERING AND MECHANICAL DRAWING.

PROF. R. E. CHANDLER.

Under the head of boilers will be considered the materials used in their construction, the relative advantages and disadvantages of such materials, methods of construction, strength and tests of boilers, different types of boilers, heaters and economizers, safety apparatus, regulators, incrustation and corrosion, care of boilers, etc.

Lectures will be given on the general principles of mechanism and prime movers which will include the general theory of motion, valve gearing, types and construction of machinery in practice; steam engines, hot air engines, and water wheels.

In mechanical drawing during the first year students

will be given practice in the use of instruments. The plates will include work in geometrical drawing, perspective, and detail drawings of machine parts.

During the third year students will be engaged in the drawing room working out practical problems in descriptive geometry, shades and shadows, machine design, topographical work, etc.

DEPARTMENT OF CHEMISTRY.

DR. TRAPHAGEN.

MR. W. M. COBLEIGH, E. M.

GENERAL CHEMISTRY.

Chemistry, inorganic and organic, occupies the entire first year and is developed with especial reference to the periodic law. As success in the more advanced work depends so closely upon a mastery of the principles of the science, we aim to attain that end. Attention is directed during the year to the relations of the elements and their compounds, and to their properties and uses. The preparation of the various metals and useful compounds for the market is dwelt upon, and later in the course special attention is given them under the subjects of Chemical Technology, Metallurgy, etc.

Class room discussions on the subjects under consideration are encouraged and an effort is made to secure a habit of collateral reading on the part of the student.

A constant application of the facts and principles of chemistry is made to every-day life, for the purpose of showing the wide possibilities of the use of chemical knowledge.

Courses of lectures, supplemented by text book work wherever possible, and references to current literature, are given on the following subjects:

CHEMICAL PHYSICS.

Under this head the physical methods for determining the constitution of chemical compounds and nature of chemical changes are studied. Attention is especially directed to the chemical effects of light, heat, electricity, etc.

CHEMICAL PHILOSOPHY.

The work of this branch consists chiefly in the solution of numerous problems, including volume of gases, calculation of the proportions of chemicals necessary in various practical operations. and the study of the mathematical relations of the elements in general.

CHEMICAL TECHNOLOGY.

Chemical Technology will be taught by lectures with illustrations of processes, by use of charts, models, samples of crude materials and also of intermediate and finished products. Wagner's Chemical Technology will be used for constant reference by the students. The subjects will be divided as follows:

First.—Metallurgy in Its Relations with Chemistry. Including those metals of economic importance.

Second.—Technology of Fuel. Including Thermometry, Determination of value of Fuels, Charcoal, Peat, Lignite, Coal, Coke, Heating Arrangements, Gas, Mineral Oil, Paraffin and Solar Oil, Lighting, Photometry, Candles, Lamps, Gas Lighting, Electric Light.

Third.—Chemical Manufacturing Industry. Including Water and Ice, Artificial Mineral Waters, Sulphur, Sulphuric Acid, Potassium and Sodium Salts, Chlorine, Bromine and Iodine, Nitric Acid, Explosives, Ammonia, Phosphorous, Matches, Phosphates, Manures, Boric Acid, Compounds of the Metals having industrial applications, Ultramarine and other inorganic pigments, Thermochemistry.

Fourth.—Organic Chemical Manufactures. Including

Alcohols, Ethers, Organic Acids, Coal Tar, Organic Coloring Matters, Coal Tar Colors, Benzol Colors, etc.

Fifth.—Glass Manufacture. Ceramics, Mortars and Cements.

Sixth.—Articles of Food and Consumption; including Starch and Dextrine, Sugar, Wine, Beer, Spirits, Flour and Bread, Milk, Butter and Cheese, Meat, Nutrition, Effects of Various Kinds of Diet.

Seventh.—Chemical Technology of Fibres; including Wool, Silk, Vegetable Fibres, Bleaching, Dyeing and Tissue Printing, Paper Manufacture.

Eighth.—Miscellaneous Organic Chemical Arts and Manufactures; including Tanning, Glue, Size and Gelatine, Bones, Fats, Soap, Essential Oils and Resins, Preservation of Wood.

PRACTICAL CHEMISTRY.

A preliminary course in laboratory practice is given the student to make him familiar with the preparation and properties of the more common reagents before any actual work in chemical analysis is begun. The entire course is steadily progressive, the student proving, so far as possible, the truth of each fact as he masters it.

QUALITATIVE ANALYSIS.

The elements are separated into groups by the student and their action with various reagents carefully studied. Tables of resemblance are prepared and the reactions taking place in every test are expected to be fully understood and noted by the proper symbols. After a similar study of the acids the student determines the metal and acid of unknown salts and when proficient in this proceeds to the separation and identification of the constituents of unknown complex mixtures.

QUANTITATIVE ANALYSIS.

Salts of known composition are first analyzed and after accuracy is established, more complex natural and artificial compounds are submitted. The samples are chosen with especial reference to the requirements of the students in the various courses, the Agricultural students devoting themselves to the analysis of soils, fertilizers, grains, milk, butter, fodder, etc.; while the students in Applied Science analyze ores, furnace products, etc. While accuracy is the principal object and gravimetric methods generally used, whenever speed can be attained without impairing the results, shorter methods will be given. Colorimetric and volumetric methods will be carefully taught and the student thoroughly grounded in the underlying principles of each method.

ASSAYING.

DR. F. W. TRAPHAGEN.

The situation of our College makes a thorough course in Assaying one of the most important needs, and to meet it we have secured a set of samples and apparatus, and have outlined a course of work which will fully meet the requirements. We shall be able to reproduce all the conditions of the mill or commercial assay office and to give a thoroughly practical course. Before completing the course the student is given a practical series of samples, representing the daily work of the assayer of a mill or smelter, and will be required to return accurate results within the time usually occupied by the commercial assayer.

METALLURGY.

Current American and foreign methods for the economic production of the metals, either by smelting, lixiviation, electrolysis, or other methods, will be the subject of a series of lectures and recitations during which will be considered

also refractory materials, furnaces, effects of impurities and methods of eliminating the same.

Special attention will be given to the different methods for calculating furnace charges for the production of slags with definite chemical composition, and many variations of ore will be assumed.

MINERALOGY.

Lectures upon Mineralogy are given and the attention of the student is directed to the characteristics of each of the minerals whose identification is required, its resemblance to other minerals and its differences. These lectures deal with all those properties which can be distinguished without apparatus, the chemical composition and tests being only incidentally treated. Later, in Determinative Mineralogy, unknown minerals are given, and by the application of the chemical tests of blowpipe analysis, and his knowledge of Theoretical Mineralogy and of Crystallography, the student identifies the specimens.

The specimens used in this course consist of a large collection illustrating the minerals of economic importance and their associates. The students also have access to the very extensive collections of the College.

CRYSTALLOGRAPHY.

Crystallography is taught by aid of a set of models which illustrate the more important crystalline forms and their modifications. They cover all the forms of which a knowledge is necessary for the student of Mineralogy, and the student becomes thoroughly familiar with each of them.

BLOWPIPE ANALYSIS.

As a means of determining the composition of minerals and as a convenient method of analyzing, Blowpipe Analysis receives close attention. Bead, flame, coal and special reactions are carefully taught so that with his blowpipe and small set of reagents the student is able to determine the composition of any compound he is likely to meet.

PHYSICS.

The possible applications of a knowledge of Physics are so varied and its principles are so generally used in all departments of scientific research that every effort will be made to impart to the students as thorough an understanding of the subject as is possible in the time which can be given to it.

The course of laboratory experimentation covers the demonstration of the laws of moments, of falling bodies, of relationship between volumes of gases and pressures, among many others the determinations of boiling points, dew point, latent heat, specific heat, expansion.

Experiments in light are made with lenses and prisms, and practice is had with the polariscope and spectroscope.

The causes of variation of sound are studied by the aid of appropriate apparatus.

The best arrangement of batteries is learned by measuring the effects of the currents obtained by the various plans. The resistance of wires, the heating effect of the current, the principle of the dynamo are all learned by practical work with the apparatus secured for this purpose.

This is only a small portion of the work done, but serves to illustrate how valuable a laboratory course in physics may be.

GEOLOGY.

Lectures in connection with the use of Le Conte's Elements of Geology, as a text, occupy the entire year. The work is divided into Physical, Structural and Historical Geology, and includes practice in the identification of the age of rocks by fossils, stratigraphical work in the field, and identification of the crystalline rocks by microscopic examination.

ECONOMIC GEOLOGY.

Economic Geology is treated by lectures under the following general headings:

1. Ore Deposits; Classification, Genesis, Occurrence.
2. Coals, Petroleum and Natural Gas.
3. Building Stone.
4. Abrasive Materials.
5. Natural Salts.
6. Gems.
7. Limes, Cement and Artificial Stone.
8. Pigments.
9. Water.
10. Phosphates.
11. Clays used for Pottery, Porcelain, etc.
12. Sands for Glass.
13. Miscellaneous Topics.

ENGLISH.

PROF. B. F. MAIDEN.

Students in the course of Applied Science will be required to take a course of study in English which will extend throughout the Freshman and Sophomore years.

MATHEMATICS.

PROF. A. M. RYON.

PROF. R. E. CHANDLER.

Students in the course of Applied Science must be prepared to commence the study of Plane and Spherical Trigonometry. Higher Algebra and Analytical Geometry will be completed during the Freshman year. Differential and Integral Calcu-

lus and Mechanics will be taken up during the Sophomore and Junior years.

A thorough knowledge of these branches will be necessary in order that the student may be prepared to study intelligently the Applied Mathematics which come later in the Engineering Department work.

DESCRIPTIVE GEOMETRY.

During the first year recitations will be held in Descriptive Geometry three times a week throughout the year. The work in the Draughting Rooms during the third and fourth years will afford the student opportunities for applying practically the principles acquired in the class room.

PREPARATORY DEPARTMENT.

~~PROF. B. F. MARDIS.~~

MISS M. A. CANTWELL.

~~Miss May Harris.~~

~~The experience of the past two years demands that a change be made in the Preparatory Department.~~

~~The course of one year as a preparation for the College courses and the Business course, has proven unsatisfactory.~~ The enlarged course provides not only a thorough drill in the common branches, but in addition, a formal introduction to the natural sciences, and an option in Latin for those who wish to do more thorough language work.

~~In a word, we hope that the two years' preparation will give us college students who know better how to study.~~

~~Another worthy end served by this additional year in the Preparatory course also encourages the change.~~ Many students will enter and complete the Preparatory work whom circumstances will not permit to go on through college. This is one of the great problems confronting all public and intermediate schools. However, the student who goes no further than to complete our preparatory work will have the advantage of an introduction to laboratory work and methods; a glimpse at good literature in the reading which extends through the ~~two years~~ course, and a good elementary drill in English composition, and so be fairly equipped to meet the demands that the world now makes upon all young men and women.

While it shall be the aim of the institution to encourage all preparatory students to pursue a College course, we hope that the new arrangement will be more practical and more

helpful to many who shall find it quite impossible to go on through more advanced work.

For entrance, students should be at least fourteen years of age, and competent to pass an examination in Arithmetic through Denominate Numbers; should possess a fair knowledge of English Grammar and Geography, and be able to write well.

TO PARENTS AND STUDENTS.

It is highly important that students should enter at the commencement of the fall term.

Those entering later must adapt themselves to classes started at the first of the term.

PREPARATORY COURSE.

FIRST YEAR.

FALL TERM—

Arithmetic	5
English Grammar	4
Geography (Descriptive)	5
Spelling	4
Readings from American Authors.	2

WINTER TERM—

Arithmetic	5
Grammar	4
Geography (Physical)	5
Spelling	4
Readings from American Authors.	2

SPRING TERM—

Arithmetic (Metric System and Business Arithmetic)	5
Elementary Botany	5
Grammar	4
Spelling	4
Readings from American Authors.	2

SECOND YEAR.

FALL TERM—	
Elementary Algebra	5
English Composition	4
Elementary Physics	5
Latin or	5
Etymology and	3
Readings from American Authors.	2
WINTER TERM—	
Elementary Algebra	5
U. S. History	4
Elementary Physiology	5
Latin or	5
Etymology and	3
Readings from American Authors.	2
SPRING TERM—	
Elementary Algebra	5
U. S. History	4
Elementary Chemistry	5
Latin or	5
Etymology and	3
Readings from American Authors.	2

The requirements for entrance to the course of Applied Science will be found with the schedule of that course, in another part of the catalogue.

BUSINESS DEPARTMENT.

COURSE IN BOOK-KEEPING.

PROF. H. G. PHELPS.

MISS JENNIE JONES.

REQUIREMENTS FOR ENTRANCE.

Those wishing to enter this course are required to pass an examination in English Grammar and Composition (Reed & Kellogg's grammar is used), Arithmetic including Common and Decimal Fractions, Denominate Numbers, Percentage, and Equation of accounts.

WORK REQUIRED.

The work of this course will require the student's entire time and attention.

FALL TERM.	WINTER TERM.
Penmanship.	Penmanship.
Business Law.	Business Letter Writing.
Spelling.	Book-keeping.
Book-keeping.	

SPRING TERM.

Penmanship. Book-keeping.

BUSINESS PRACTICE FROM START TO FINISH.

That is the kind of Book-keeping we teach. There is no theoretical (valueless) work to occupy ths student's time, but instead he begins business with a cash capital of $5,000 and buys merchandise of, and sells to his fellow students; writes checks, notes and drafts; buys and sells merchandise on

commission; in fact, transacts all kinds of business just the same as if he were a Merchant, Wholesale Dealer, Banker or Broker. By recording these transactions in his account books by Double and Single Entry, the student becomes a first-class book-keeper; and more—he becomes a practical business man. This system not only designs to give, but DOES give the same training that one acquires in actual business.

WHEN TO ENTER.

We say enter whenever you can conveniently. You can do just as good work by entering in the middle of the term as at the beginning, for no two students work together.

PENMANSHIP.

One period each day is given to Plain business writing. We do not teach Ornamental Penmanship in the school room for we think business writing more essential. The student is also taught Lettering for box marking.

BUSINESS LAW.

A modern text book is used and supplemented by lectures. Access may be had to a complete list of reference books in the library.

BUSINESS LETTER WRITING.

The student studies this subject from a modern text book. Students learn the mechanical arrangement of business and social letters and then write original letters from data furnished by the text and the instructor. The time devoted to the subject is sufficient to give the ambitious student excellent drill in this work.

EXPENSE.

Books and Stationery for the entire year should not cost more than $12.00.

COURSE IN SHORT-HAND AND TYPE-WRITING.

FALL TERM.

Manual of Short-hand.
Business Law.
Spelling.
Penmanship.
Type-writing.

WINTER TERM.

Reporter's Companion.
Business Letter Writing.
Type-writing.
Dictation.

SPRING TERM.

~~Business Letters~~, Phrase Boook, Type-writing, Dictation.

The examination for entrance to this course is the same as that for Book-keeping, ~~exclusive of Equation of Accounts.~~ However, more attention will be given to Grammar than to Arithmetic.

SPEED.

Students are required to write not less than 75 words per minute and transcribe the same on the Type-writer before graduation. The books and stationery will cost about $6.00.

Time to Enter.

Those who wish to pursue this course should enter at the beginning of the term. Those entering later must take up the work of some class.

DEPARTMENT OF MUSIC.

PIANO.

MISS KATE CALVIN.

In this course special attention is given to thorough technique, and correct interpretation with practical analysis of rhythm and form.

Selections from the following course in Piano will be given according to the ability of the students:

Instruction in theory and History of Music will be free to all members of the Piano Department.

Jadassohn and Emery's Harmony will be used, and those wishing to take a complete course in Piano must pass examination in Harmony.

Frequent recitals will be given by the students for the purpose of acquiring confidence in playing at public concerts. Pupils will also receive special training in memorizing and sight-reading.

COURSE OF STUDY.

First Year—Fundamental Technique; selections from the five finger exercises of Louis Kohler. Melodious Exercises. Enckhausen, Book I Duvernoy op. 176 Books 2 and 3. Czerny's Studies revised by Germer Book I, Part I. Selection from Easier Sonatine and Sonatas of Clementi, Kuhlau, Mozart and Haydn.

Second Year—Daily Technique; Czerny, Germer Studies, Books 1 and 2: Major and Minor Scales. Heller op. 47, Book 2; Felix Le Couppey, op. 20 and op. 26; Loeschorn's School of Velocity, Books 1 and 2. 12 Kleine Praludien Bach.

Miscellaneous classics from Mozart, Haydn, Beethoven, Schumann and Mendelssohn.

Third Year—Daily Technique; German Studies Book 2 School of Velocity, Loeschorn Books 2 and 3; Two Voice Inventions, J. S. Bach; Concertos, Mozart; Easier ones of Beethoven. Miscellaneous Classics; Sonatas of Hummel, Nocturins—Nos. 3 and 5 Field; Selections by Bach, Mozart, Handel, Beethoven, Schubert, Mendelssohn, Schumann, Chopin, also from Grieg, Godard, Scharwenkas, Paderewski and other modern composers.

Fourth Year—Daily Technique Studies; Moscheles op. 70; op. 25. Cramer op. 84; Czerny's Virtuoso School, Book 1 op. 365; Fugues by Bach; Czerny's School for the Left Hand op. 718; Gradus by Clementi; Concertos, Mendelssohn and Beethoven; Miscellaneous Classics; also selections from modern composers.

VIOLIN.

PROF. ALBERT WRIGHT.

Tuition on any other stringed instrument, can be had upon special application.

Particular attention will be given to ensemble playing, also Orchestral work, one evening each week being devoted to these classes.

COURSE OF STUDY.

First Year—Berthold Tours, elementary; Alard's Method in conjunction with Kayzer's studies on Bowing, and Divertissements according to capacity of pupil.

Second Year—Herman's Books 2 and 3, Maza's special studies, op. 36, and studies from Rode, Kreutzer, Baillot, Divertissements from Mozart, Beethoven, Golterman, Haydn and Spohr.

Third Year—Schroder's studies on Technique, Fiorillo's 36 studies, Gavinie, Kreutzer's 40 studies, Divertissements Air Varies De Beriot, Viotti's 8th concerto, Beethoven's Sonatas, and Concertos by Spohr, Rode, Bruch.

MILITARY SCIENCE.

The College is entitled to the detail of a United States army officer, and when such detail is made instruction will be given in Military Science and Tactics. The Government also supplies the College with arms, ammunition and tents.

The value of military training for improving the habits, manners and health of students can hardly be overestimated, and a general knowledge of military matters is highly to be desired in every community.

The Military Tactics and Drill will occupy about three hours weekly and not interfere with the student's regular work.

An officer will be detailed as soon as a suitable building can be secured.

ADMISSION.

Candidates for any class are examined in the studies of the lower classes. Students presenting certificates of proficiency from reputable schools or colleges may be admitted without examination in the branches specified in the certificate, providing they obtain the consent of the faculty.

ATTENDANCE.

Prompt attendance at all recitations, lectures and regular exercises of the College is required of every student.

Students whose absences exceed five per cent. of the total number of recitations or lectures, in any subject, will not be allowed to take the regular examinations in that subject without first presenting a satisfactory excuse to the faculty.

EXAMINATIONS.

Frequent examinations are required of every student so that the standing of each student may be readily ascertained at any time.

Reports are mailed to parents at the end of each term.

ELECTIVE STUDIES.

A certain amount of latitude in selecting studies will be allowed to special students, although any departure from the regular prescribed courses will be discouraged as a rule. Students desiring to take special courses must first obtain the consent of the faculty.

DEGREES.

Suitable degrees and certificates will be conferred on graduates from all courses.

GOVERNMENT.

Students will be expected to conduct themselves as ladies and gentlemen; those who fail to comply with this demand will be requested to leave the institution.

EQUIPMENT.

The College has a small, but carefully selected, library at present and will add to it every year.

The Reading Room is liberally supplied with the leading magazines and journals, and the State daily and weekly newspapers.

The shops for wood and iron work are equipped with suitable machinery.

The chemical and physical laboratories are thoroughly supplied with proper apparatus, and chemicals for carrying on the work of those departments.

The veterinary department has been furnished with skeletons, and instruments for carrying on dissecting work.

The engineering department has an ample supply of surveying and other instruments, including apparatus for the measurement of water.

About $500 has been spent for supplying the department of Botany with the necessary presses, microscopes, etc.

The College has started mineral and fossil collections, which include several of the World's Fair exhibits, among them the famous Anaconda exhibit. These collections will be added to from year to year.

The collection of Dr. Traphagen, consisting of about 10,000 specimens, has been secured by the College and will prove invaluable for illustrative work in mineralogy, geology, paleontology and crystallography.

The Experiment Farm has been supplied with improved farm machinery and the students will be afforded an opportunity to study the various makes of machines and their use.

EXPENSES.

Preparatory, or any College Course, per year	$10.00
Physical Apparatus (deposit)	5.00
Qualitative Apparatus (deposit)	15.00
Quantitative Apparatus (deposit)	25.00
Assaying Apparatus (deposit)	25.00
Mineralogy, including Apparatus and 100 Minerals	10.00
Deposit for Material used in Shops { Course in Wood	3.00
Deposit for Material used in Shops { Course in Iron	5.00

A sufficient charge will also be made to cover the cost of chemical and physical apparatus used by the students in the laboratories.

At the end of the term the student may return such apparatus as has not been damaged and receive in return the balance of his deposit due him. This balance ought to amount to more than 50 per cent. of the original deposit.

Ordinary chemicals are furnished by the College free.

Town students entering the Preparatory course will be charged a fee of $25.00 per year, instead of $10.00, as given above, so long as they continue in that course. They may, however, enter the College courses on payment of the regular fee of $10.00 per year.

DEPARTMENT OF MUSIC.

Fall Term—One lesson per week on Piano	$14.00
Winter Term—One lesson per week on Piano	12.00
Spring Term—One lesson per week on Piano	10.00
Total	$36.00
Fall Term—Two lessons per week on Piano	$25.20
Winter Term—Two lessons per week on Piano	21.60
Spring Term—Two lessons per week on Piano	18.00
Total	$64.80
Violin, etc., Two lessons per week, Per Term	$24.00

HARMONY.

Class lessons, $5.00 for the entire academic year.

Board and lodging may be obtained in the city for $4.00 per week and upward.

PAYMENT OF FEES.

All fees must be paid in advance. Students will not be permitted to enter classes until their fees are paid.

INDEX.

FOURTH.

ANNUAL CATALOGUE

OF THE

Montana College

OF

AGRICULTURE

AND

Mechanic Arts,

BOZEMAN, - - - MONTANA.

For the Academic Year 1895-96

AND ANNOUNCEMENTS

FOR 1896-97.

HELENA, MONTANA:
STATE PUBLISHING COMPANY,
STATE PRINTERS AND BINDERS
1896.

CALENDAR.

1896.

Examinations for Entrance and Conditions	Tuesday, Sept. 15.
Fall Term begins	Wednesday, Sept. 16.
Short Course in Agriculture begins	Thursday, Oct. 15.
Fall Term closes	Friday, Dec. 18.
Holiday Recess begins	Saturday, Dec. 19.

1897.

Holiday Recess closes	Monday, Jan. 4.
Winter Term begins	Tuesday, Jan. 5.
Short Course in Agriculture ends	Thursday, Mar. 18.
Winter Term closes	Wednesday, Mar. 31.
Spring Term begins	Thursday, April 1.
Baccalaureate Day	Sunday, June 7.
Field Day	Monday, June 8.
Literary Society's Exhibition	Tuesday, June 9.
Annual Concert	Wednesday, June 10.
Preparatory and Undergraduate Exhibition	Thursday, June 11.
Commencement Day	Friday, June 12.
Summer Vacation	June 13 to September 16

HISTORY AND ENDOWMENT.

The Montana College of Agriculture and Mechanic Arts owes its existence to an act of the Montana Legislature which met in 1893.

This Institution will be supported by funds received from the United States Government, under the "Act of 1890, for the Further Endowment of Agricultural Colleges," from appropriations which may be made from time to time by the State Legislature, and by funds which may be received from the sale and lease of 140,000 acres of public land in the State of Montana, donated to the College by the United States government. The government appropriation provides that colleges of this class shall receive the sum of fifteen thousand ($15,000) dollars for the year ending June thirtieth, eighteen hundred and ninety, and an annual increase of such appropriation thereafter for ten years, by an additional sum of one thousand ($1,000) dollars over the preceding year, and the annual amount to be paid thereafter to each state and territory "shall be twenty-five thousand ($25,000) dollars."

THE EXPERIMENT STATION.

In connection with the College, an Agricultural Experiment Station has been established. The object of this Station is to further the interests of the agricultural industries in the State of Montana. This is done by con-

ducting researches and experiments which may include the physiology of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of Montana, as may seem advisable. For the support of this important department the United States government appropriates yearly the sum of fifteen thousand ($15,000) dollars.

The wording of the acts of congress appropriating land and funds for the maintenance of agricultural colleges, clearly shows that it was the intention of the framers to provide for courses in agriculture, mechanic arts, and such other branches as may be found to be most desirable for the particular state in which each college is located.

The Executive Board and Faculty of the Montana College of Agriculture and Mechanic Arts have, therefore, with this aim in view, established courses of instruction in Agriculture, Chemistry, Mechanical Engineering, Science, Business, a course in Domestic Science, and also a Preparatory Department.

These courses have been carefully arranged with the view of furnishing, so far as is possible, such instruction

as will be most beneficial to Montana students, and to Montana interests in general, and it is believed that in one or the other of these courses, the majority of the young men and the young women of the state will find a line of work suited to their tastes and abilities. The College not yet having buildings of its own, will occupy temporarily the Bozeman Academy Building, and some of the rooms in the new High School building. These buildings are situated only a few hundred feet apart. Gallatin County and the City of Bozeman having generously presented the College with one hundred and eighty acres of land, which is well watered and but a short distance from the temporary College quarters, there will be no delay in commencing the practical farm work.

The College is indebted to Mr. Nelson Story, of Bozeman, for his generous gift of fifteen hundred dollars, made during a period of financial panic, as payment for the land which is to be used as a site for the College buildings.

THE NEW BUILDINGS.

The State Legislature passed a bill authorizing the issue of bonds to the amount of $100,000, giving as security 50,000 acres of Agricultural College lands, for the purpose of erecting College buildings. During the present year, five buildings will be erected, viz: a Main building, a Chemical and Physical Laboratory, a Shop building, a Drill Hall, and a Veterinary building. It is hoped that these buildings will be completed during the present year.

LOCATION.

The site chosen for the College is one of the most beautiful that could be imagined, being a beautiful elevation southwest of the City of Bozeman, and within the city limits. The city has been fitly named "Bozeman, the Beau-

tiful," seated as it is at the head of one of the most fertile valleys in the world, and enclosed by the snow capped peaks of the Bridger and Gallatin mountains. In the vicinity are some of the most picturesque canons, and the botanist and geologist can find nowhere richer fields for study and observation.

In economic resources, both agricultural and mineral, and in scenic effects, nature has been most generous.

MONTANA STATE BOARD OF EDUCATION.

GOVERNOR J. E. RICKARDS, (ex-officio) ..... Helena
ATTORNEY GENERAL H. J. HASKELL (ex-officio)..... Helena
SUPT. OF PUB. INST. E. A. STEERE (ex-officio)..... Helena

J. E. MORSE ..... Dillon
T. E. Collins ..... Great Falls
(Term expires February 1st, 1897.)
J. M. HAMILTON..... Missoula
O. F. GODDARD..... Billings
(Term expires February 1st, 1898.)
R. G. YOUNG ..... Helena
H. H. Grant ..... Grantsdale
(Term expires February 1st, 1899.)
J. A. BAKER ..... Butte
JAMES REID..... Bozeman
(Term expires February 1st, 1900.)

OFFICERS OF THE BOARD.

J. E. RICKARDS,
President.

T. E. COLLINS,
Vice President.

E. A. STEERE,
Secretary.

EXECUTIVE BOARD.

IN CHARGE OF THE AGRICULTURAL COLLEGE AND THE EXPERIMENT STATION.

LESTER S. WILLSON.....Bozeman
(Term expires February 1st, 1897.)

PETER KOCH.....Bozeman
(Term expires February 1st, 1898.)

NELSON STORY.....Bozeman
(Term expires February 1st, 1899.)

WALTER COOPER.....Bozeman
(Term expires February 1st, 1900.)

GEO. KINKEL, JR.....Manhattan
(Term expires February 1st, 1901.)

OFFICERS OF THE BOARD.

LESTER S. WILLSON,
President.

GEO. KINKEL, JR.,
Vice President.

PETER KOCH,
Secretary and Treasurer.

FACULTY.

JAMES REID, A. B., PRESIDENT,
Mental and Moral Sciences and Astronomy.

S. M. EMERY,
Horticulture.

FRANK W. TRAPHAGEN, PH. D., F. C. S.,
Physics, Chemistry and Geology.

W. L. WILLIAMS, V. S.
Veterinary Science and Physiology.

W. H. WILLIAMS, M. E.,
Mechanical Engineering and Mathematics,

FRANK BEACH, B. S.
Irrigation Engineering and Agriculture.

*_____
Botany, Zoology and Entomology.

WILL F. BREWER, A. M.,
Latin and English.

MRS. F. E. MARSHALL,
Art.

MRS. ELIZA OWENS,
Instructor in Domestic Science.

W. M. COBLEIGH, E. M.,
Assistant in Chemistry and Physics.

MISS M. A. CANTWELL,
Principal of Preparatory Department.

MISS MAY TRAVIS, A. M.,
Assistant in Preparatory Department and Mathematics.

H. G. PHELPS,
Business Department.

MISS KATE P. CALVIN,
Piano.

* To be elected.

EXPERIMENT STATION STAFF.

S. M. EMERY, DIRECTOR,
Horticulturlist.

F. W. TRAPHAGEN,
Chemist.

W. L. WILLIAMS, V. S.,
Veterinary Science.

FRANK BEACH,
Agriculturist and Irrigation Engineer.

REGISTER OF STUDENTS.

1895-1896.

COURSE IN AGRICULTURE.

SENIOR CLASS.

OLIVER P. MORGAN.....Duncan

JUNIOR CLASS.

E. V. BLANKENSHIP.....Bozeman

FRESHMAN CLASS.

THOMAS MARKS.....Big Timber

LADIES' COURSE.

SENIOR CLASS.

FLORENCE FOSTER.....Bozeman
LUCY STAFFORD.....Pony

JUNIOR CLASS.

CLARA FOSTER.....Bozeman
EDNA ROBINSON.....Bozeman
SADIE SHAW.....Bozeman

SOPHOMORE CLASS.

GRACE STANTON.....Bozeman
CARRIE STAATS.....Bozeman

FRESHMAN CLASS.

MAY A. PEASE.....Bozeman
LIZZIE STUCKEY.....Bozeman

APPLIED SCIENCE.

SOPHOMORE CLASS.

Reno Sales	Bozeman
J. C. Young	Timberline

FRESHMAN CLASS.

Thomas O. Caldwell	Spring City, Tenn.
Howard Shaw	Bozeman
Peter Sieh	Belgrade

SPECIAL AND UNCLASSIFIED STUDENTS.

Elliot Boyles	Bozeman
Jeanette Cameron	Bozeman
Irvin Cockrill	Bozeman
Eva Eckenbeck	Bozeman
Kate Ferris	Bozeman
John P. Flowers	Bozeman
Mattie Gardner	Bozeman
Claude Henderson	Bozeman
Hattie Koch	Bozeman
Mary C. Lewis	Bozeman
Paul W. Milburn	Miles City
Chas. B. Orr	Dillon
Hattie Parkins	Belgrade
Nellie Patterson	Bozeman
Samuel Sharman	Spring Hill
W. T. Shaw	Bozeman
Virgie Spain	Belgrade
T. B. Story	Bozeman
Herman B. Waters	Bozeman
Lily White	Bozeman
Frank Willson	Bozeman
Fred Willson	Bozeman
Albert T. Williams	Wickes
Mary J. Winter	Bozeman
I. K. Wisner	Bozeman

BUSINESS.

Frank Alderson	Bozeman
S. A. Blakely	Bozeman
W. O. Bohart	Bozeman
Gertrude Brandley	Bozeman
Margaret Ellis	Bozeman
Retta E. Hanson	Pony
Ralph S. Jarrett	Springdale
Albert Kreuger	Bozeman
Carl Lehrkind	Bozeman
Henry Lehrkind	Bozeman
Belle Marshall	Bozeman
James Martin	Bozeman
Chas. R. Mendenhall	Hunter's Hot Sp'gs
Albert Metzel	Puller Springs
Mary Monforton	Bozeman
Perry McAdow	Bozeman
Lottie Oakwood	Bozeman
Leonora Robinson	Bozeman
Millie L. Strickland	Livingston
Halsey Van Doren	Myersburg
Charles Van Tassell	Bozeman
Alice Welsh	Bozeman
Lester Wolverton	Bozeman

STENOGRAPHY AND TYPEWRITING.

Wm. E. Cushing	Dillon
Nettie Hanson	Pony
Nellie Imes	Bozeman
May Jay	Pony
Hattie Street	Bozeman

PREPARATORY DEPARTMENT.

FIRST YEAR.

Thurman Ault	Belgrade
Frances Barnett	Bozeman
Wilbert J. Boomer	Bozeman
Harry R. Buell	Bozeman
Rosa L. Buker	Pony
Edmund Burke	Salesville
Frank L. Cowan	Bozeman
Lester Davis	Bozeman
Thos. G. Davis	Belgrade
Mary Davison	Bozeman
Walter O. Downing	Lewiston
Gertie Ferguson	Bozeman
Eugene A. Ferguson	Bozeman
Rhesis Fransham	Bozeman
Joseph Hayden	Chestnut
Guy H. Hinds	Brandenburg
Clarence Jeffers	Ennis
J. C. Kelly	Hunter's Hot Sp'gs
Layton Kent	Bozeman
Seymour Kent	Bozeman
Willard Knadler	Belgrade
Lizzie I. Lewellen	Bozeman
Zoe Monforton	Bozeman
John B. Monforton	Bozeman
Chas. H. Sappington	Sappington
Fred. W. Smith	Enterprise, Oregon
Dora M. Sprague	Bozeman
Antoinette Tintinger	Big Timber
Theo. D. Tintinger	Big Timber
Maud Wisner	Bozeman
Eugene Wolverton	Bozeman

SECOND YEAR.

Lizzie Arnold	Bozeman
Allan Carmichael	Hamilton
Frank N. Davies	Bozeman
Effie Gum	Bozeman
Pearl Hulbert	Bozeman
Bertha Jeffers	Ennis
Clifford Jeffers	Ennis
Edgar B. Jones	Myersburg
Wyatt Jones	Myersburg
John Kountz	Bozeman
John D. Lewellen	Bozeman
Edward N. Lyon	Lyon
Edna A. Maynard	Ennis
Ellie J. Moore	Belgrade
Wm. E. Parkins	Belgrade
H. C. Patterson	Manhattan
C. S. Patterson	Manhattan
Martin Peel	Ennis
Wm. D. Provinse	Red Lodge
Arthur P. Reese	Bozeman
Joseph A. Reese	Bozeman
Lester E. Robinson	Bozeman
Tyrie I. Sappington	Sappington
Will Simons	Bozeman
Kate M. Sprague	Bozeman
Robert H. Sprague	Bozeman
Ora Vestal	Big Timber
Fred Wylie	Bozeman

MUSIC.

PIANO.

Mrs. J. Baker	Bozeman
Elliott Boyles	Bozeman
Edith Brown	Bozeman
Ada Fell	Bozeman
Eleanor Ferris	Bozeman
Mabel Foster	Bozeman
Bertha Freeman	Bozeman
Carrie Gardner	Bozeman
Ellen Gottschalk	Bozeman
Anna Gottschalk	Bozeman
Nina Hansen	Bozeman
Agnes Hellinger	Bozeman
Katie Hoy	Bozeman
Edgar B. Jones	Myersburg
Ethel Lansing	Bozeman
Edna Lewis	Bozeman
Gertrude Luce	Bozeman
Edith Marks	Bozeman
Julia Martin	Bozeman
James Martin	Bozeman
Ernestine Nichols	Bozeman
Grace Nichols	Bozeman
Hattie Parkins	Bozeman
May Pease	Bozeman
Leonora Robinson	Bozeman
Edna Robinson	Bozeman
Virgie Spain	Belgrade
Olla Ruffner	Bozeman
Grace Stanton	Bozeman
Belle Stanton	Bozeman
T. B. Story	Bozeman
Louis Taylor	Bozeman
Bessie Thorpe	Bozeman
Mabel Thorpe	Bozeman
Gertrude Traphagen	Bozeman
Janet VanAllen	Bozeman
Mary Waters	Bozeman
Foley Waters	Bozeman
Fred Willson	Bozeman

SUMMARIES.

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Freshmen	7
Special and Unclassified	24
Business	23
Stenography and Typewriting	5
Preparatory	59
Music	39
Total	169
Counted Twice	14
Total Enrollment	155

COURSES OF STUDY.

SCIENTIFIC COURSE.

FRESHMAN YEAR.

Fall Term.

General History, 3
Literature, 2
*Trigonometry, Dom. Sc. or Lat. 5
Higher Algebra, 2 (Optional)
General Chemistry, 5
History of Art, 2
Drawing } 1 to 5 P. M.
Laboratory }

Winter Term.

General History, 3
Literature, 2
*Analytics, Dom. Sc. or Latin, 5
General Chemistry, 5
History of Art, 2
Drawing } 1 to 5 P. M.
Laboratory }

Spring Term.

General History, 3
Literature, 2
*Analytics, Dom. Sc. or Latin, 5
Botany, 3
Zoology, 2
History of Art, 2
Drawing } 1 to 5 P. M.
Laboratory }

SOPHOMORE YEAR.

Fall Term.

Current Topics and History, 2
Business Law, 5
Botany, 3
Zoology, 2
*Calculus, Latin or Dom. Sc., 5
Shops (Wood) } 1 to 5 P. M.
Laboratory }

Winter Term.

Current Topics and History, 2
Physiological Botany 3
Zoology, 2
*Calculus, Latin or Dom. Sc., 5
Astronomy, 5
Shops (Iron) } 1 to 5 P. M.
Laboratory }

Spring Term.

Current Topics and History, 2
Plant Diseases and Economic Entomology, 5
*Calculus, Latin or Dom. Sc., 5
Pedagogy or Org. Chemistry, 5
Book-keeping } 1 to 5 P. M.
Laboratory }

* Ladies are required to take Domestic Science; Mathematics, or Latin is optional in the Freshman and Sophomore years.

JUNIOR YEAR.

Fall Term.

Meteorology, 3
Hydraulics, 2, (Opt.)
Constitutional History, 3
Literature, 2
Chemical Philosophy, 3
Bacteriology, 2
Machine Shops, (Opt.)

Winter Term.

Human Physiology, 5
Civics, 3
Literature, 2
Hydraulics, 2, (Opt.)
Chem. Phil. or Biology, 3
Physics, 5
Laboratory.

Spring Term.

History of Economics, 3
Literature, 2
Crystallography, 2
History of Philosophy, 5
Economic Botany or Chemical Analysis.

SENIOR YEAR.

Fall Term.

Economics, 5
Logic, 5
Geology, 5
Biology, (Opt.)
Mineralogy.

Winter Term.

Psychology, 5
International Law, 5
Geology, 5
Biology, (Opt.)
Laboratory Geology.

Spring Term.

Ethics, 5
Sociology, 5
Thesis.

AGRICULTURAL COURSE.

FIRST YEAR.

Fall Term.

History, 3
Literature, 2
General Chemistry, 5
Physics and Chemistry of Soils, 5
Laboratory.

Winter Term.

History, 3
Literature, 2
Field Crops, 5
History of Agriculture, 2
General Chemistry, 5
Drawing,
Laboratory, (Opt.)

Spring Term.

History, 3
Literature, 2
Botany, 3
Zoology, 2
Irrigation and Drainage, 5
Drawing,
Laboratory.

SECOND YEAR.

Fall Term.

Current Topics and History, 2
Business Law, 5
Botany, 3
Zoology, 2
Feeding, 3
Farm Buildings, 2
Shops, (Wood)
Laboratory.

Winter Term.

Current Topics and History, 2
Physiological Botany, 3
Zoology, 2
Astronomy or Dairying, 5
Breeds and Breeding, 5
Shops, (Iron)
Laboratory.

Spring Term.

Current Topics and History, 2
Plant Diseases and Economic Entomology, 5
Diseases of Animals, 5
Horticulture, 5
Book Keeping,
Laboratory.

LADIES COURSE.

DOMESTIC SCIENCE AND ART.

Fall Term.

Hand Sewing, 3
Plain Cooking, 2
Drawing, Form and Col. 5
History and Literature, 5
Latin or Chemistry or Trig. 5
Physical Culture.

Winter Term.

Machine Sewing, 3
Chemistry of Foods, 2
Drawing, Form and Col., 5
History and Literature, 5
Latin or Analytics or Gen. Chem, 5
Physical Culture.

Spring Term.

Plain Garments Complete, 3
Cooking and Canning, 2
Drawing, Form and Col., 5
History and Literature, 5
Latin or Analytics or Botany, 5
Physical Culture.

SECOND YEAR.

Fall Term.

Draughting and Cutting, 3
Invalid Cooking, 3
Current Topics, 2
Household Art, 5
Business Law, 5
Latin or Botany or Calculus, 5
Physical Culture.

Winter Term.

Dressmaking and Fitting, 3
Fancy Cooking, 2
Applied Design, 5
Current Topics, 2
Latin or Astronomy or Calculus, 5
Physical Culture.

Spring Term.

Dress Completed, } 3
Thesis, }
Household Economy, } 2
Bills of Fare, }
Embroidery, (white and colored), 5
Current Topics, 2
Latin or Calculus or Book-keeping 5
Physical Culture.

COURSE IN CHEMISTRY.

FRESHMAN YEAR.

Fall Term

General Chemistry, 5
History, 3
Literature, 2
Trigonometry or Latin, 5
Drawing } P. M.
Qual. Laboratory }

Winter Term.

General Chemistry, 5
History, 3
Literature, 2
Analytics or Latin, 5
Drawing, } P. M.
Blowpipe Laboratory }

Spring Term.

Organic Chemistry, 5
History, 3
Literature, 2
Botany, 3
Zoology, 2
Biology & Chemistry, Lab's, P. M.

SUMMER VACATION, MEMOIR.

SOPHOMORE YEAR.

Fall Term.

Chemical Philosophy, 3
Metallurgy, 2
Business Law, 5
Current Topics and History, 2
Botany, 3
Zoology, 2
Abstracting, 1
Shops and Laboratory, P. M.

Winter Term..

Chemical Philosophy, 3
Metallurgy, 2
Current Topics and History, 2
Physiological Botany, 3
Zoology, 2
Astronomy, 5
Abstracting, 1
Laboratory Work, P. M.

Spring Term.

Crystallography, 2
Metallurgy, 3
Current Topics and History, 2
Theoretical Chemistry, 3
Photography, 2
Abstracting, 1
Laboratory Work, P. M.

SUMMER VACATION, MEMOIR.

JUNIOR YEAR.

Fall Term.

Chemical Technology, 3
Economic Geology, 2
Meteorology, 3
Constitutional Hist. and Economics, 5
Bacteriology, 2
Abstracting, 1
Laboratory Work, P. M.

Winter Term.

Chemical Technology, 3
Economic Geology, 2
Constitutional Hist. & Economics, 5
Physics, 5
Human Physiology, 5
Abstracting, 1
Laboratory, P. M.

Spring Term.

Chemical Technology, 3
Economic Geology, 2
History of Economics, 2
Literature, 3
History of Philosophy, 5
Abstracting, 1
Laboratory Work, P. M.

SUMMER VACATION, MEMOIR.

SENIOR YEAR.

Fall Term.

Economics, 5
Logic, 5
Geology, 5
Mineralogy, 5
Laboratory, P. M.

Winter Term.

Psychology, 5
International Law, 5
Geology, 5
Laboratory, P. M.

Spring Term.

Ethics, 5
Sociology, 5
Research work on subject for Thesis.

COURSE IN MECHANICAL ENGINEERING.

FRESHMAN YEAR.

Fall Term.

General History, 3
Literature, 2
Trigonometry, 5
General Chemistry, 5
Higher Algebra, 2
Laboratory, Shops, (Wood) — 1 to 5 P. M.

Winter Term.

General History, 3
Literature, 2
Analytics, 5
General Chemistry, 5
Laboratory, Shops, (Iron) — 1 to 5 P. M.

Spring Term.

General History, 3
Literature, 2
Descriptive Geometry, ½ term, 5
Analytics, ½ term, 5
Laboratory,

SOPHOMORE YEAR.

Fall Term.

Business Law, 5
Calculus, 5
Descriptive Geometry, 5
Physics, 5
Laboratory.

Winter Term.

Surveying, 2
Calculus, 5
Physics, 5
Astronomy, 5
Shops, Laboratory, — 1 to 5 P. M

Spring Term.

Calculus, 5
Physics, 5
Machine Design, 2.
Mechanism, Gear Teeth,
Machine Tools, 3
Laboratory Shops, [Machine] — 1 to 5 P. M.

JUNIOR YEAR.

Fall Term.

Mechanics, 5
Mechanical Engineering, 5
Boilers, Indicators, Valve Gears,
Kinematics, 2
Drawing, 3

Winter Term.

Mechanics, 5
Mechanical Engineering, 5
Valve Gears and Resistance of Materials,
Kinematics, 2
Drawing, 3

Spring Term.

Mechanics, 5
Mechanical Engineering, 5
Kinematics, 2
Working Drawings, 3
Machine Design,
Mechanical Drawing.

SENIOR YEAR.

Fall Term.

Economics, 5
Stresses in Structures, 5
Mechanical Engineering, 5
Machine Design,
Lectures, Transmis'n of Power, 2
Drawing, 3

Winter Term.

Psychology, 5
Stresses in Structures, 5
Graphical Statics,
Mechanical Engineering, 5
Metallurgy, 2
Experimental Tests in Laboratory.

Spring Term.

Sociology, 5
Hydraulic Engineering,
Electrical Engineering,
Thesis,
Shop Work.

SHORT COURSE IN AGRICULTURE.

FIRST YEAR.

FALL TERM—

Arithmetic.
Grammar.
Penmanship.
Reading and Spelling.
Animal Anatomy and Physiology.
Dairy Husbandry.

WINTER TERM—

Arithmetic.
Grammar.
Penmanship.
Reading and Spelling.
Animal Hygiene.
Small Fruits and Orcharding.
Shop Work.

SECOND YEAR.

FALL TERM—

English Composition.
Elementary Physics.
Diseases of Farm Animals.
General Agriculture.
Farm Accounts.

WINTER TERM—

Elementary Chemistry.
Elementary Botany.
Irrigation.
Gardening and Forest Tree Planting.
Animal Feeding.
Shop Work.

Lectures on agricultural topics will be given throughout the course, and will be illustrated as far as possible.

All subjects in the short agricultural course will be made elective, so as to give the utmost freedom to those who enter it.

The course will extend over two years of two terms each.

The first term will begin on the 15th of October, and end with the beginning of the Christmas holidays.

The second term will begin immediately after the holidays, and end the middle of March.

AGRICULTURAL COURSE.

AGRICULTURE.

PROF. FRANK BEACH.

BREEDS AND BREEDING.

In this department of the College, the student takes up during the second year, a study of the most prominent breeds of domestic animals that have been introduced into the United States. Their origin, the history of their development, their characteristics, points of merit and defect, and their uses and adaptability to climate are treated, special attention being given to those breeds best suited to the wants of our own State. Curtis' treatise on "Horses Cattle, Sheep and Swine" is used as a basis for the work, and is supplemented by lectures and observations of the animals themselves among the different breeds as far as practical.

The principles of breeding, the laws or heredity, causes of variation, the formation of breeds, value of pedigree, atavism, crossing, the selection of breeding stock and many other topics relating directly to this important subject are considered.

STOCK FEEDING.

A portion of the second year is devoted to the Principles of Animal Feeding, in which the composition and requirements of animal bodies, the chemical composition of foods necessary to supply these wants, the general law of animal nutrition and the chemical action and values of the different kinds of food are discussed. The German Standard rations are given thorough study, special work being done in compounding Montana foods. The student figures out the nutritive ratios, showing in what proportions they may be used to make properly balanced rations for the different purposes of feeding, without the loss of more than a small per cent. of any of the nutrients. A consideration of the proper foods for each class of animals, whether fed for labor, growth, milk or meat production, is made prominent. The progress and results of the feeding experiments at the various Agricultural Experiment Stations are also carefully reviewed and discussed.

SOILS AND CROPS.

Two terms of the First year ~~is~~ are given to the study of soils and fertilizers, the history and cultivation of the cereal crops, the value of a rotation of crops, and the most approved schemes of rotation, special and local crops, comparison of the different branches of Agriculture and the general subject of farm economy, including the structure, selection, use and care of farm tools and machinery.

Having taken two years in the Agricultural Course, the student may enter the Junior year of the Scientific Course and graduate in two years.

HORTICULTURE.

S. M. EMERY, DIRECTOR.

HORTICULTURE.

Instruction in Horticulture is given largely by practical operations in the nursery, garden and orchard, such as pruning, grafting, budding and making cuttings and layers.

The study of fruits includes the following topics: Methods of propagation, preparation of ground, cultivation and after treatment, winter protection, storage and marketing, hybridization and organization of new varieties, diseases and their remedies.

Vegetables are considered in the same general way. The history and the peculiarities of individual varieties are studied and also the best methods employed in their cultivation. The aim is to cover all parts of the subject of Horticulture.

FORESTRY.

The consideration of this subject includes not only a study of various forest trees and their uses, but also the production and conservation of forest and forest conditions, the relations of forests and climate and the general topics of forestry legislation and economy. Instruction will be chiefly by lectures and the subject will be made as practical as possible.

LANDSCAPE GARDENING.

Two exercises per week are given in connection with forestry. The location of buildings, the laying out of grounds, the making of lawns and roads, the proper grouping and distribution of ornamental trees, shrubs, and flowering plants and numerous kindred topics are included in the course.

NATURAL AND PHYSICAL SCIENCES.

BOTANY.

The study of Botany is begun in the Preparatory course so that students who cannot take advanced courses may have the advantage of an elementary course. It is commenced in the spring term of the second year and is carried on twice a week throughout the third year.

Advanced work in Botany is taken up in the Spring term of the Freshman year, three times per week and is continued during the Sophomore year. The morphology of flowering plants is studied from living specimens, of which a sufficient variety are taken to prepare the student for the use of Coulter's Manual. The object sought is to study plants, using books merely as a guide. The course includes a thorough study of the physiology of flowering plants, with typical forms of the lower division of the vegetable kingdom. An hebarium of fifty species is required from each student. One term will be given to the study of Plant Disease and Economic Botany.

ZOOLOGY.

PROF. W. L. WILLIAMS.

The subject of Zoology is begun in the Sophomore year, and is taught chiefly by laboratory methods.

Students are expected to study with the microscope the smaller forms of animal life and the more minute parts of larger animals.

Abundant fresh and alcoholic specimens are supplied for dissection and study, to intelligently illustrate the classification of animals, as based upon their structure and development.

The laboratory and text book work is supplemented by lectures, and students are required to make constant use of the various books of reference contained in the library.

The course is intended to give concisely, a clear knowledge of the systematic arrangement of animals, their differences and affinities; their distribution geographically and in time; their adaptation in form and structure to their habits and environments, and the forces which tend to modify them.

ENTOMOLOGY.

This study embraces the anatomy, transformation, classification and geographical distribution of insects, illustrated by charts, drawings and dissections made by the students themselves. The student becomes familiar with insect life, habits and transformations, by collecting preserving and rearing specimens of our native species. Special attention is given to economic entomology, fostering beneficial and destroying noxious insects. Particular attention is given to species injurious to vegetation, their habits and the methods of checking their ravages.

HUMAN PHYSIOLOGY.

W. L. WILLIAMS.

The elements of Human Physiology are studied in the Preparatory Course.

Human Anatomy and Physiology is taught in the winter term of the Junior year in the Agricultural and Ladies' courses.

Instruction is given in part by lectures and partly by text with Martin's Human Body as a reference book. Lectures and text are illustrated as far as possible by the human skeleton; by dissections of animals in which the various organs most nearly resemble those of man, and by the use of the microscope for demonstrating the finer structure of the various tissues.

CHEMISTRY, GEOLOGY, MINERALOGY AND PHYSICS.

DR. TRAPHAGEN.

MR. W. M. COBLEIGH, E. M.

These subjects in so far as they are required of students in other courses, will be studied with the students of the course in Chemistry, and further remarks will be found under these headings, in that part of the catalogue devoted to a description of the work of the Department of Chemistry.

METEOROLOGY.

The work in this branch is confined: First, to the study of the temperature, weight and motions of the atmosphere and the instruments and methods of measuring them; Second, to the study of precipitation and the relation of climate to Agriculture. A United States weather station will be maintained at the College, and daily telegraphic weather predictions will be received, as well as the Montana daily weather charts. These predictions and weather charts are studied by the class.

ASTRONOMY.

The course in astronomy aims to give not merely an application of Mathematics, but also a knowledge of the physical condition of the universe, the laws which govern the motions of the celestial bodies and an insight into the methods by which the science has been brought to its present state.

VETERINARY SCIENCE.

PROF. W. L. WILLIAMS.

The instruction in Veterinary Science has been arranged with a view to fostering the important live stock interests of the State, encouraging the breeding and handling of better animals, and securing them as far as possible from disease.

The instruction, while not leading to a special degree in Veterinary Science, is similar in character, so far as it extends, to that prevailing in first-class veterinary schools, and will afford excellent preparation to students expecting later to pursue the study of veterinary medicine and surgery.

Veterinary Anatomy, occupying one term, will be taught in part by lectures illustrated by means of charts and skeletons; but mainly in the dissecting room where the various domestic animals and birds will be dissected and studied. Chauveau's Comparative Anatomy of Domestic Animals will be used as a reference book.

Animal Physiology (one term) will be taught largely by lectures, with Smith's Physiology of Domestic Animals as reference; the work being illustrated by charts, apparatus, microscopical preparations, physiological experiments, etc.

Veterinary Hygiene, extending over one term, will be taught by lectures in part, and by text based on Smith's Veterinary Hygiene. The subjects of breeding, feeding, stabling and general management with a view to promoting health and avoiding disease, will be thoroughly considered.

Students having pursued satisfactorily the foregoing studies may at their option devote one term to Veterinary Medicine and Surgery, and one term to Veterinary Obstetrics, including the care and management of young and breeding animals.

As soon as practicable, clinics will be held during the college year, to which diseased animals may be brought for free treatment; the operations on such animals being performed as far as possible by advanced students, under the immediate direction of the professor in charge.

Students will also have the privilege of seeing as far as may be convenient, cases occurring in the private practice of the veterinarian. They will also be expected to see and aid in experiments with animal diseases at the Experiment Station. Books, journals, instruments, apparatus and animal skeletons, ample for illustration and instruction are provided.

MATHEMATICS.

PROF. W. H. WILLIAMS.

MISS MAY TRAVIS.

Students will commence the study of Algebra at the beginning of the Second year of the Preparatory Course. During the year they will complete the Algebra required, which will include simple and quadratic equations, radicals, and indeterminate equations. During the Third year plane and solid geometry will be completed.

Students in these courses have the privilege of studying advanced Mathematics as laid down in the Scientific and Mechanical Engineering Courses.

SHOP WORK.

PROF. W. H. WILLIAMS.

In the Agricultural course two terms of practice in the shops is required. The object is to familiarize the student with the use and care of tools and to give him some skill in ordinary work. All necessary tools will be furnished by the College, but the students will be required to pay for the material used.

A well lighted room, 47 ft. by 41 ft. in the basement of the new Experiment Station building, has been set apart for use as an iron and wood-working shop, and contains three 16-in. screw cutting lathes, one 22-in. by 22-in. iron planer, one 20-inch drill press, three lathes for wood turning, one 15-horse power engine, one 20-horse power boiler, together with a complete outfit of hand tools, both for iron and wood working.

One term of shop work is required of all students in the Chemical Course, and two terms in the Mechanical Engineering Course.

ART DEPARTMENT.

MRS. F. E. MARSHALL.

Work in this department is required during the three terms of the Freshman year, in the Agricultural, Domestic Science and Scientific Courses.

The plan of study includes technical instruction in drawing from the round, perspective, plane geometry, industrial design and decorative work, clay modelling and wood carving, with painting in oil and water-color.

Lectures are given on historic architecture and ornament, and the history of ancient and modern art.

The aim of the entire course will be to give the student a solid foundation for future work, whether as artist or artisan.

HISTORY, POLITICAL SCIENCE.

PRES. JAMES REID.

PROF. W. F. BREWER.

HISTORY.

This course has been extended to five full terms, including the whole Freshman year, while current topics and History is taken in the Sophomore year.

During the Freshman year the course will embrace a comprehensive course in General History, i. e., an outline of society in ancient, mediaeval and modern times. The class work, which will occupy but three periods per week, will be supplemented by assigned supplemented readings and thesis work. With a view to laying a broad, stable foundation upon which to base a careful and intelligent study of our own constitution and the various applications of government under it, one full term will be devoted to the study of the Constitutional History of England and the United States.

The History of Economics occupies the third term of the Junior year. This study of the rise and development of economic theories is especially valuable. First, it presents the leading facts of mediaeval and modern history as viewed from a new standpoint—that of the economist—thus giving the student a better comprehension of History as a whole. And again, it affords a natural and helpful introduction to the theory of Economics and Sociology which is taken up in the Senior year.

POLITICAL ECONOMY.

This subject embraces a consideration of all the relations of capital and labor, by which citizens are directed in their industrial pursuits. All partisan teaching is avoided. Current practical problems in industrial society are discussed in the light of economic principles. It is also the aim of the instructor to awaken the interest of the students in the discussion of sociology in its various aspects, and to aid them in the formation and expression of clear, sound and logical views; and to encourage them to think for themselves on all questions pertaining to individual enterprise and public prosperity.

CONSTITUTIONAL LAW.

This subject embraces in a comprehensive manner, a discussion of the principles involved in the government of the state, county, city and town organizations, as well as those involved in the government of the United States. As every citizen takes part more directly in the local than in the general government, he needs to understand the power and relations of the state and municipal governments. An endeavor is also made to show not only *what* our free institutions are, but *why* they exist, by tracing their development from the beginning of the English Constitution through the Colonial and revolutionary periods of our own country's history. The qualifications of an elector and the general rights and duties of the citizen are also touched upon.

ENGLISH.

PROF. W. F. BREWER.

The aim of this department is to teach students to say what they have to say most effectively; and so to train their appreciation of literature, that it shall become to them a permanent means of intellectual and spiritual growth.

RHETORIC AND COMPOSITION.

The work begins in the second year of the preparatory course and extends throughout the third year. It presupposes a thorough knowledge of English Grammar. The course will begin with the simplest elements of expression, but the student will be expected to begin original composition as early as possible. A large amount of written work will be required along the lines that are found to be the most helpful. So far as can be arranged, the work in composition will be individual, and the instructor will use personal conference, as the best means of helping the student to become the master of his own powers.

In connection with this work, the form of some of the best examples from the various departments of literature will be made the subject of study, and some will be read and studied in the class room, the object being to develop in the student a love for standard literature.

LITERATURE.

The first two terms of the Freshman year will be devoted to the study of American Literature. The number of au-

thors considered will be small, and a thorough study of each will be attempted. The written work will be continued from the previous year, but will be directed more to the interpretation and criticism of Literature. The memorizing of selections from some of the best known writings will form a part of the work. The spring term of this year will be spent in reading two or more of the plays of Shakespeare. In connection with this and with the study of the following year, written work will be required, and outside reading will be expected.

During the Sophomore year, two hours each week will be spent in the study of Current Topics and History, with written work. During the Junior year, two hours weekly will be given to the study of English Literature since the time of Shakespeare. Only a few representative authors will be read in class, but each student will be assigned topics for investigation and written report, and the papers thus presented will be discussed before the class.

RHETORICALS.

Some time will be given each week to rhetorical work, and all students will be required to take part from time to time. The work will consist of orations, declamations, essays and readings. The programmes will be arranged by a committee of the Faculty.

MENTAL AND MORAL SCIENCE.

PRES. JAMES REID.

The work in this department, aims to introduce the student to an acquaintance with the nomenclature, definitions, methods, great problems and aims of philosophical study. The transition by the young student from studies mainly objective, as is the greater part of the curriculum, to studies chiefly reflective and subjective, is often to the average student, a difficult and unwelcome experience. Any course of preliminary instruction, therefore, calculated to smooth the way for this transition by familiarizing the student's thought with the terms, definitions, method and easier problems, must be as valuable as welcome to the student. Suitable elementary texts in Logic, Psychology and Ethics will be chosen to perform this important office, supplemented by a course of lectures especially prepared as an introduction to a more comprehensive study of Philosophy. The History of Philosophy will be studied during the spring term of the Junior year.

LOGIC.

The work in this subject will occupy the first term of the Senior year. Of the value of the study of Logic both as a mental gymnastic and as a special training of the faculties for the discovery of truth and the detection of error, nothing need be urged.

Our method of instruction includes thorough study of the text book and a practical application of the principles

of Logic to the student's habits of thinking and expression, and to the detection of logical falzacies in examples chosen from standard literature.

PSYCHOLOGY.

The winter term of the Senior year is devoted to this study. Careful attention will be given to the double aspect of this science, approaching it from the standpoints of consciousness and physiology. Class discussion and debate on the many interesting and practical questions that constantly present themselves in pursuing this study will be encouraged, and thesis work assigned to develop such questions more fully.

ETHICS.

During the last term of the Senior year the study of Ethics is taken up and is carried on daily throughout the term. The various ethical theories are discussed for which the student is prepared from his studies in the History of Philosophy and Psychology.

SOCIOLOGY.

This work is also carried on during the last term of the Senior year. The origin and history of human society, the various social phenomena, and the laws controlling human intercourse will be treated.

MECHANICAL DEPARTMENT.

PROF. W. H. WILLIAMS.

In the Agricultural and Scientific courses, two terms of shop work are required. The object is to familiarize the student with the care and use of tools and to give him some skill in ordinary work.

Students will find this training very useful, while it will enable those who follow agricultural pursuits to understand the mechanical principles of machinery and to know how to keep it in repair. With these objects in view courses as extensive as the time will allow have been laid out. All tools will be furnished by the college, but the students will be required to pay for the material used.

COURSE IN WOOD WORK.

The equipment for the course in wood work consists of three 10" wood turning lathes made by Prentice Brothers, provided with chisels and gouges for wood turning.

Five complete sets of carpenters tools together with suitable benches to work at are provided. In wood turning the student is first required to turn a cylinder to exact dimensions, then to turn beads on it. After sufficient skill has been acquired in this line, such exercises as turning balls, goblets, etc., are given, face plate and chuck work also receive attention. In bench work a systematic course is given embracing sawing to line, with exercises in splicing, mortising and dove-tailing. Here as elsewhere throughout the shop work courses, all exercises are con-

structed from working drawings, the object being to thoroughly familiarize the student with the use of such mechanical drawings.

COURSE IN METAL WORK.

The equipment for this course consists of one 22-inch x 22-inch, 5-foot bed metal planer built by Flather & Co., two 16-inch rise and fall carriage screw cutting lathes, and one 16-inch lathe with compound rod by the same makers, one 20-inch drill press made by Prentice Brothers, together with a very complete set of taps, dies, drills, reamers, etc. There are two benches fitted up for vise work providing accommodation for five students.

Each student is provided with a full set of files, chisels, hammer, callipers, square scales, etc. The exercises in bench work include chipping, filing, scraping, and polishing. The work on the machines consists of a series of graduated exercises in planing, turning, boring, drilling, thread-cutting and polishing. The exercises being especially designed to train the judgment of the students and to teach the methods of handling the various tools.

The motive power of the department is furnished by a 20 horse power boiler and a 15 horse power Racine Automatic engine. Each student is required to take charge of the engine and boiler, thus becoming familiar with the duties of an engineer.

A forge shop for the teaching of blacksmithing is about to be fitted up. It will be furnished with four forges, each forge being provided with a complete set of blacksmiths tools. The work given in this department will include upsetting, drawing, bending and welding, forging and tempering tools and case-hardening.

MECHANICAL ENGINEERING.

A course has been organized in Mechanical Engineering which extends over four years. It is understood that those who enter this course have had a thorough fundamental training, as this is the first essential to a successful engineer. The student entering the course must have graduated from the Preparatory course, or be a graduate of an accredited High School, otherwise he will be required to pass an examination in all the subjects. Greater satisfaction and profit is gained from the study of engineering when the student has already acquired a broad and thorough general training. Engineers are frequently called upon to fill the highest positions in the community, demanding breadth of view and wide general training.

It will be seen in looking over the work required, that the Mathematical and Theoretical are strong in the earlier part, and the applied courses in the later part of the course, while draughting and shop courses are carried more or less throughout the course. The aim is also to give such a liberal training in the English language as to enable the graduates to write good English, and present professional and other subjects with ease, clearness and effectiveness.

During the course the subject of boilers will be taken up, a course of lectures being delivered on the material used in their construction, the relative advantages and disadvantages of such material, methods of construction, strength and tests of boilers, heaters and economizers,

incrustation and corrosion, care of boilers, etc. Some time will be devoted to the subject of indicators, practice in taking indicator cards and making engine tests will be given, and one term will be devoted to the study of valve gears.

Two terms will be occupied in the study of the elements of machine design, the construction of steam engines, and water motors, and other prime movers.

MECHANICAL DRAWING.

Students in the Engineering course are required to take a thorough course in Mechanical Drawing, as we believe it is better to train students to make clear working drawings than to attempt to turn out fancy draughtsmen, only a few exercises in the more theoretical parts of the subjects are given, the student being at once set to work just as if he were employed in an engineering establishment. He is required to sketch certain parts of the machinery in the shop, and from these sketches to make working drawings, tracings and finally blue prints. Neatness in the work and plain, legible figuring and lettering are insisted upon. The student is trained to make drawings that are clear, easily read and arranged to the best advantage. Exercises will also be given in machine and engine designing.

SURVEYING.

Instruction in the theory of surveying will be given. Practical work in the field will be carried on, and will include pacing, chaining, ranging with poles, reading compass bearings, compass survey, adjustment and use of the hand level, topographical surveys with hand level, ad-

justment of the transit, exercise in reading of angles with the transit, determination of the true meridian by an observation on polaris with the transit, and also with the solar attachment, traverse with the transit and steel tape, adjustment of the telemeter wires and measurement of distances by telemeter and gradienter, azimuth traverse with telemeter and gradienter measurements, city survey, adjustment of the wye level, line of levels run with wye level and Phila. rod, railroad surveying and earthwork calculation.

Lectures will also be given on the use of the plane table, solar compass and solar attachment for the transit.

DEPARTMENT OF CHEMISTRY.

DR. TRAPHAGEN.

MR. W. M. COBLEIGH, E. M.

The purpose of the course in Chemistry is to make educated chemists—men who are not only qualified to make correct analyses of what may be handed them, but who have also had, with their technical training, a good liberal education. The possibilities of the successful application of chemical knowledge to the solution of the problems of daily life on the farm, in the smelter, in the dye works, in the sugar refinery, in the gas works, in nearly all manufactures and the arts, are too well appreciated to need any argument.

The range of chemical knowledge is too wide to-day to be covered by any one man, so it will be wise, when the student of the chemical course has covered the required work, for him to select some definite line of work which

he may decide to make his specialty. This is quite possible, as each student does the greater part of his work, not in the class room, but individually in the laboratory and library.

GENERAL CHEMISTRY.

As a foundation for the work in the College Courses, a course in elementary Chemistry is given in the third year of the Preparatory course. Remsen's Introduction is used as a text book, the students being required to perform individually the experiments therein suggested in the laboratory of practical chemistry.

Chemistry, inorganic and organic, occupies the entire first year and is developed with especial reference to the periodic law. As success in the more advanced work depends so closely upon a mastery of the principles of the science, we aim to attain that end. Attention is directed during the year to the relations of the elements and their compounds, and to their properties and uses. The preparation of the various metals and useful compounds for the market is dwelt upon, and later in the course special attention is given them under the subjects of Chemical Technology, Metallurgy, etc.

Class room discussion on the subjects under consideration are encouraged, and an effort is made to secure a habit of collateral reading on the part of the student.

A constant application of the facts and principles of chemistry is made to every-day life, for the purpose of showing the wide possibilities of the use of chemical knowledge.

All the class room work is accompanied by laboratory practice.

Courses of lectures, supplemented by text book work wherever possible, and references to current literature, are given on the following subjects:

CHEMICAL PHYSICS.

Under this head the physical methods for determining the constitution of chemical compounds and nature of chemical changes are studied. Attention is especially directed to the chemical effects of light, heat, electricity, etc.

CHEMICAL PHILOSOPHY.

The work of this branch consists chiefly in the solution of numerous problems, including volumes of gases, calculation of the proportions of chemicals necessary in various practical operations, and the study of the mathematical relations of the elements in general.

CHEMICAL TECHNOLOGY.

Chemical Technology will be taught by lectures with illustrations of processes, by use of charts, models, samples of crude materials and also of intermediate and finished products. Wagner's Chemical Technology will be used for constant reference by the students. The subjects will be divided as follows:

First—Metallurgy in Its Relations with Chemistry; including those metals of economic importance.

Second—Technology of Fuel; including Thermometry, Determination of value of Fuels, Charcoal, Peat, Lignite, Coal, Coke, Heating Arrangements, Gas, Mineral Oil, Paraffin and Solar Oil, Lighting, Photometry, Candles, Lamps, Gas Lighting and Electric Light.

Third—Chemical Manufacturing Industry; including Water and Ice, Artificial Mineral Waters, Sulphur, Sulphuric Acid, Potassium and Sodium Salts, Chlorine, Bromine and Iodine, Nitric Acid, Explosives, Ammonia, Phosphorous, Matches, Boric Acid, Compounds of the Metals

having industrial applications, Ultramarine and other in organic pigments, Thermochemistry.

Fourth—Organic Chemical Manufactures; including Alcohols, Ethers, Organic Acids, Coal Tar, Organic Coloring Matters, Coal Tar Colors, Benzol Colors, etc.

Fifth—Glass Manufacture, Ceramics, Mortars and Cements.

Sixth—Articles of Food and Consumption; including Starch and Dextrine, Sugar, Wine, Beer, Spirits, Flour and Bread, Milk, Butter and Cheese, Meat, Nutrition, Effects of Various Kinds of Diet.

Seventh—Chemical Technology of Fibres; including Wool, Silk, Vegetable Fibres, Bleaching, Dyeing and Tissue Printing, Paper Manufacture.

Eighth—Miscellaneous Organic Chemical Arts and Manufactures; including Tanning, Glue, Size and Gelatine, Bones, Fats, Soap, Essential Oils and Resins, Preservation of Wood.

Ninth—Applications of Chemistry to Agriculture; Chemistry of soils, Fertilizers, etc.

JOURNAL MEETINGS—ABSTRACTING.

In order to develop in the student a habit of careful reading, each student will be required to make abstracts of articles on assigned subjects from the leading journals, and present them at a weekly meeting of students and department instructors, where the topics are freely discussed. They are thus kept in touch with the progress of the science.

CHEMISTRY OF FOODS AND COOKING.

A course of lectures is given the students of Domestic Science on the above subject amply illustrated by experi-

ments, by charts and by samples showing composition of the most important foods. A requisite for these lectures is a knowledge of general chemistry.

PHOTOGRAPHY.

An opportunity will be afforded students for the study of the general principles of photography. A very successful camera club existing under the auspices of the College is a great aid in developing interest in this art among the students.

PRACTICAL CHEMISTRY.

A preliminary course in laboratory practice is given the student to make him familiar with the preparation and properties of the more common reagents before any actual work in chemical analysis is begun. The entire course is steadily progressive, the student proving, so far as possible, the truth of each fact as he masters it.

QUALITATIVE ANALYSIS.

The elements are separated into groups by the student and their action with various reagents carefully studied. Tables of resemblance are prepared and the reactions taking place in every test are expected to be fully understood and noted by the proper symbols. After a similar study of the acids, the student determines the metal and acid of unknown salts, and when proficient in this, proceeds to the separation and identification of the constituents of unknown complex mixtures.

QUANTITATIVE ANALYSIS.

Salts of known composition are first analyzed and after accuracy is established, more complex natural and artificial compounds are submitted. The samples are chosen with especial reference to the requirements of the students in the various courses, the Agricultural students devoting themselves to the analysis of soils, fertilizers, grains, milk, butter, fodder, etc., while the students in Applied Science analyze ores, furnace products, etc. While accuracy is the principal object, and gravimetric methods generally used, whenever speed can be attained without impairing the results, shorter methods will be given. Colorimetric and volumetric methods will be carefully taught, and the student thoroughly grounded in the underlying principles of each method.

ASSAYING.

DR. F. W. TRAPHAGEN,

The situation of our College makes a thorough course in Assaying one of the most important needs, and to meet it we have secured a set of samples and apparatus, and have outlined a course of work which will fully meet the requirements. We shall be able to reproduce all the conditions of the mill or commercial assay office, and to give a thoroughly practical course. Before completing the course the student is given a practical series of samples, representing the daily work of the assayer of a mill or smelter, and will be required to return accurate results within the time usually occupied by the commercial assayer.

METALLURGY.

Current American and foreign methods for the economic production of the metals, either by smelting, lixiviation, electrolysis, or other methods, will be the subject, of a series of lectures and recitations, during which will be considered also refractory materials, furnaces, effects of impurities and methods of eliminating the same.

Special attention will be given to the different methods for calculating furnace charges, for the production of slags with definite chemical composition, and many variations of ore will be assumed.

MINERALOGY.

Lectures upon Mineralogy are given and the attention of the student is directed to the characteristics of each of the minerals whose identification is required, its resemblance to other minerals and its differences. These lectures deal with all those properties which can be distinguished without apparatus, the chemical composition and tests being only incidentally treated. Later, in Determinative Mineralogy, unknown minerals are given, and by the application of the chemical tests of blowpipe analysis, and his knowledge of Theoretical Mineralogy and of Crystallography, the student identifies the specimens.

The specimens used in this course consist of a large collection illustrating the minerals of economic importance and their associates. The students also have access to the very extensive collections of the College.

CRYSTALLOGRAPHY.

Crystallography is taught by aid of a set of models which illustrate the more important crystalline forms and

their modifications. They cover all the forms of which a knowledge is necessary for the student of Mineralogy, and the student becomes thoroughly familiar with each of them.

BLOWPIPE ANALYSIS.

As a means of determining the composition of minerals and as a convenient method of analyzing, Blowpipe Analysis receives close attention. Bead, flame, coal and special reactions are carefully taught so that with his blowpipe and small set of reagents the student is able to determine the composition of any compound he is likely to meet.

PHYSICS.

The possible application of a knowledge of Physics are so varied, and its principles are so generally used in all departments of scientific research, that every effort will be made to impart to the students as thorough an understanding of the subject as is possible in the time which can be given to it.

The course of laboratory experimentation covers the demonstration of the laws of moments, of falling bodies, of relationship between volumes of gases and pressures, among many others the determinations of boiling points, dew point, latent heat, specific heat, and expansion.

Experiments in light are made with lenses and prisms, and practice is had with the polariscope and spectroscope.

The causes of variation of sound are studied by the aid of appropriate apparatus.

The best arrangement of batteries is learned by measuring the effects of the currents obtained by the various plans. The resistance of wires, the heating effect of the

current, and the principle of the dynamo are all learned by practical work with the apparatus secured for this purpose.

This is only a small portion of the work done, but serves to illustrate how valuable a laboratory course in physics may be.

GEOLOGY.

Lectures in connection with the use of Le Conte's Elements of Geology, as a text, occupy the entire year. The work is divided into Physical, Structural and Historical Geology, and includes practice in the identification of the age of rocks by fossils, stratigraphical work in the field, and identification of the crystalline rocks by microscopical examination.

The fact that the Livingston and Three Forks folios, just issued by the U. S. Geological Survey, cover the region immediately surrounding us, shows how favorably we are situated for field work in geology under the best conditions.

We have within a few miles of the College, not only stratified rocks covering great ranges of geological time, but we have also many of the eruptives, which have been carefully studied and described by expert geologists.

ECONOMIC GEOLOGY.

Economic Geology is treated by lectures under the following general headings:

1. Ore Deposits; Classification, Genesis, Occurrence.
2. Coals, Petroleum and Natural Gas.
3. Building Stone.

4. Abrasive Materials.
5. Natural Salts.
6. Gems.
7. Limes, Cement and Artificial Stone.
8. Pigments.
9. Water.
10. Phosphates.
11. Clays used for Pottery, Porcelain, etc.
12. Sands for Glass.
13. Soils.
14. Miscellaneous Topics.

HIGHER MATHEMATICS.

PROF. W. H. WILLIAMS.

MISS MAY TRAVIS.

Students entering the course of Mechanical Engineering must be prepared to commence the study of Plane and Spherical Trigonometry. Higher Algebra and Analytical Geometry will be completed during the Freshman year. Differential and Integral Calculus, Descriptive Geometry and Advanced Physics are taken up in the Sophomore year. One term of Advanced Physics is given to the students in the Chemical and Scientific courses in their Junior year.

PREPARATORY DEPARTMENT.

MISS M. A. CANTWELL.

MISS MAY TRAVIS.

The course has been extended to three years which will place it on a level with the courses in our accredited high schools. Meagre and poor preparatory training for professional courses has borne a sufficiently bountiful harvest of inefficient professional work. The course as extended provides not only a thorough drill in the common branches, but in addition, elementary work in the natural sciences, and an option in Latin for those who wish to do more thorough language work.

This course will give the student who cannot afford the time and expense required for a college course, the opportunity to obtain a sufficient knowledge of English for the ordinary work of life, and such an acquaintance with the sciences as may develop within him the faculty of observation and bring him into closer touch with Nature. The desire is also to give the preparatory student some knowledge of Manual Training. For this purpose, we give two terms of Drawing in the third year, in addition to which the student has the laboratory work in connection with his study of the sciences.

A liberal course of reading is given for each year of the preparatory work, and students are requested to cover the course as far as possible. It is also desired that they purchase the works named thus making them a part of their own library.

PREPARATORY COURSE.

FIRST YEAR.

Fall Term.

Grammar, 4.
Arithmetic, 5.
Descriptive Geography, 5.
Spelling, 3.
Reading and Literature, 3.

Winter Term.

Grammar, 4.
Arithmetic, 5.
Geography (D. & P), 5.
Spelling, 3.
Reading and Literature, 3.

Spring Term.

Grammar, 4.
Arithmetic, 5.
Phy. Geography, 5.
Spelling, 3.
Reading and Literature, 3.

SECOND YEAR.

Fall Term.

Eng. Composition, 4.
Algebra, 5.
Anatomy, 5.
Etymology and Literature or Latin, 5.

Winter Term.

Eng. Comp. and U. S. History, 4.
Algebra, 5.
Physiology, 5.
Etymology and Literature or Latin, 5.

Spring Term.

Algebra, 5.
Botany, 2.
U. S. History, 4.
Etymology and Literature or Latin, 5.

THIRD YEAR.

Fall Term.

Rhetoric, 5.
Botany, 2.
Physics, 3.
Latin or Drawing, 5.
Geometry, 5.

Winter Term.

Rhetoric, 5.
Botany, 2.
Physics, ½ Term, 3.
Chemistry, ½ Term, 3.
Latin or Drawing, 5.
Geometry, 5.

Spring Term.

Rhetoric, 5.
Botany, 2.
Chemistry, 3.
Latin or Drawing, 5.
Geometry, 5.

Students who intend to take the Mechanical Course should take Drawing.

COURSE OF READING FOR PREPARATORY DEPARTMENT.

FIRST YEAR.

Poor Richard's Almanac.
Evangeline.
Lincoln's Gettysburg Speech.
Knickerbocker's History of New York, or Sketch Book.
Memorize "Thanatopsis."
Declaration of Independence.
Snowbound.
Little Men, or Little Women.
Dicken's Child's History of England.
Autocrat at the Breakfast Table.

SECOND YEAR.

Merchant of Venice, or Julius Caesar.
Kathrina—Holland.
Emerson's Fortunes of the Republic.
Conquest of Mexico.
Ivanhoe, Kenilworth, or Rob Roy.
Locksley Hall, or Enoch Arden.
Motley's Rise of the Dutch Republic.
Sesame and Lilies.
Last Days of Pompeii.
Spanish Armada—Macauley.
David Copperfield, Oliver Twist, Pickwick Papers, or Bleak House.

THIRD YEAR.

Heroes and Hero Worship.
Emerson's Essay on Behavior.
Scarlet Letter, or House of Seven Gables.
Vanity Fair.
Lays of Ancient Rome.
Main Traveled Roads—Hamlin Garland.
Lectures on Architecture and Art—Ruskin.
Our Mutual Friend, or Nicholas Nickelby.
History of Literature—Carlyle.
Prince of India, or Ben Hur.

All students should read regularly one of the leading periodicals found in the College Library.

BUSINESS DEPARTMENT.

COURSE IN BOOK-KEEPING.

PROF. H. G. PHELPS.

REQUIREMENTS FOR ENTRANCE.

Those wishing to enter this course are required to pass an examination in English Grammar and Composition, Arithmetic, including Common and Decimal Fractions, Denominate Numbers, and Percentage.

CURRICULUM.

Fall Term.

Penmanship.
Business Law.
Spelling.
Book-keeping.

Winter Term.

Penmanship.
Business-Letter Writing.
Book-keeping.

Spring Term.

Penmanship.
Book-keeping.

"LEARN TO DO BY DOING."

The foregoing heading is our motto. The student is furnished a Cash Capital of $5,000. His next step is to deposit this cash with the First National or the Second National Bank as he chooses. He then begins to transact business among his fellow students, buying and selling merchandise for cash, sight and time paper, and on

account. As soon as one kind of business is completed the student begins a new one, bringing into it the resources and liabilities of the latest business. This method is followed throughout the course.

By recording all the transactions in his books of account, by Double and Single Entry, the student becomes a first class book-keeper and more—he becomes a practical business man. He receives the same training that would be given him in an office, but in much less time.

COURSE IN SHORT-HAND AND TYPE-WRITING.

Fall Term.	*Winter Term.*
Manual of Short-Hand.	Reporter's Companion.
Business Law.	Business-Letter Writing.
Spelling.	Type-Writing.
Penmanship.	Dictation—Business Letters.
Type-Writing.	

Spring Term.

Phrase Book. Type-Writing.
Dictation—Thorne's Practical Reporting.

The examination for entrance to this course is the same as that for book-keeping. However, more attention will be given to Grammar than to Arithmetic.

TIME TO ENTER.

Those who wish to pursue this course should enter at the beginning of the term. Those entering later must take up the work of some class already started.

SPEED.

Students are required to write not less than 75 words per minute and transcribe the same on the Type-writer before graduation. The books and stationery will cost about $6.00.

POST GRADUATE COURSE.

This course is designed to give a higher knowledge of accounts to those who have a longer time than one year to spend in getting a business education. Those who complete this course will have a better technical knowledge of accounts.

CURRICULUM.

Fall Term.

Office Management.
Penmanship.
Auditing.

Winter Term.

Office Management.
Penmanship.
Financial Problems Solved.
Shorthand, 5 (Optional)

Spring Term.

Lettering and Engrossing.
6 Business Essays.
Shorthand, 5 (Optional)
Typewriting, 5 (Optional.)

DEPARTMENT OF MUSIC.

PIANO.

MISS KATE CALVIN.

In this course special attention is given to thorough technique, and correct interpretation with practical analysis of rhythm and form.

Selections from the following course in Piano will be given according to the ability of the students:

Instruction in theory and History of Music will be free to all members of the Piano Department.

Jadassohn and Emery's Harmony will be used, and those wishing to take a complete course in Piano must pass examination in Harmony.

Frequent recitals will be given by the students for the purpose of acquiring confidence in playing at public concerts. Pupils will also receive special training in memorizing and sight-reading.

COURSE OF STUDY.

First Year—Fundamental Technique; selections from the five finger exercises of Louis Kohler. Melodious Exercises. Enckhausen, Book I Duvernoy op. 176 Books 2 and 3. Czerny's Studies revised by Germer Book I, Part I. Selection from Easier Sonatine and Sonatas of Clementi, Kuhlau, Mozart and Haydn.

Second Year—Daily Technique; Czerny, Germer Studies, Books 1 and 2; Major and Minor Scales. Heller op.

47, Book 2; Felix Le Couppey, op. 20 and op. 26; Loeschorn's School of Velocity, Books 1 and 2. 12 Kleine Praludien, Bach. Miscellaneous classics from Mozart, Haydn, Beethoven, Schumann and Mendelssohn.

Third Year—Daily Technique; German Studies, Book 2 School of Velocity, Loeschorn, Books 2 and 3; Two Voice Inventions, J. S. Bach; Concertos, Mozart; Easier ones of Beethoven. Miscellaneous Classics; Sonatas of Hummel, Nocturins—Nos. 3 and 5 Field; Selections by Bach, Mozart, Handel, Beethoven, Schubert, Mendelssohn, Schumann, Chopin, also from Grieg, Godard, Scharwenkas, Paderewski and other modern composers.

Fourth Year—Daily Technique Studies; Moscheles op. 70; op. 25. Cramer op. 84; Czerny's Virtuoso School, Book 1 op. 365; Fugues by Bach; Czerny's School for the Left Hand op. 718; Gradus by Clementi; Concertos, Mendelssohn and Beethoven; Miscellaneous Classics; also selections from modern composers.

MILITARY SCIENCE.

The College is entitled to the detail of a United States army officer, and when such detail is made instruction will be given in Military Science and Tactics. The Government also supplies the College with arms, ammunition and tents.

The value of military training for improving the habits, manners and health of students can hardly be overestimated, and a general knowledge of military matters is highly to be desired in every community.

The Military Tactics and Drill will occupy about three hours weekly and not interfere with the student's regular work.

An officer will be detailed as soon as a suitable building can be secured.

EQUIPMENT.

THE LABORATORIES.

A large portion of our income is expended yearly in equipment for the laboratories. This enables us to offer great inducements to students who may be able to take advantage of them.

The chemical and physical laboratories are liberally supplied with apparatus for carrying on the work of those departments.

The Veterinary Department has skeletons of the domestic animals, and all the equipment necessary for dissecting work.

The Engineering department is well supplied with surveying instruments and apparatus for the measurement of water.

The Botanical department has the herbariums collected for the World's Fair exhibit by Dr. Kelsey and the Women of Montana. The department has also excellent apparatus for mounting slides, and a number of Leitz microscopes for biological work.

The departments of Geology, Mineralogy, Paleontology and Crystallography are well equipped in mineral and fossil collections which include World's Fair exhibits, among them being the famous Anaconda exhibit, also the collection purchased from Dr. Traphagen, consisting of about 10,000 specimens, and invaluable for illustrative work.

The Farm is well supplied with the latest and most improved farm machinery which affords an opportunity for study.

The shops for wood and iron are equipped with lathes for wood and iron work, planer, drill-press, engine and complete sets of tools.

THE LIBRARY.

The library has about 2,500 well selected volumes and about 1,500 pamphlets. Its shelves are well supplied with the standard works of History, Science, and Literature. About 1,500 dollars are spent yearly in books and magazines.

The Reading Room is furnished with the following Journals, Periodicals and Magazines:

The American Machinist.
Engineering.
Veterinary Journal.
Veterinarian.
Analyst.
Chemical News.
Knowledge.
Nature.
Science Gossip.
Irrigation Age.
Engineering Mechanics.
Good Roads.
American Veterinary Review.
American Journal of Science.
American Geologist.
American Chemical Journal.
Scientific American Supplement.
North American Review.
Botanical Gazette
American Dairyman.
American Journal of Photo'phy.
Atlantic Monthly.
Educational Review.
Education.
Zoologist.
Entomological News.
Veterinary Magazine.
Century.
Harper's Monthly.
Harper's Weekly.
Cosmopolitan.
Arena.
Forum.
Review of Reviews.
Ladies' Home Journal.
Scribners.
Outing.
Popular Sc. Monthly.
Youths Companion.
Heating and Ventilation.
Journal of Pedagogy.
Engineering News.
Power.
American Machinist.
Trans. Amer. Soc. of Mech. Eng's.
Electrical World.
Machinery.
Cassiers' Magazine.
Meteorological Journal.
Beeeders' Gazette.
The Philosophical Review.
The Library Journal.
The Publishers Weekly.

The Reading Room is supplied with the following daily and weekly newspapers, all of them with two exceptions being donated.

The New York Times.
The Butte Miner.
The Helena Independent.
The Anaconda Standard.
The Rockies.
The Montana Mining Area.
The Inter-Lake.
The Livingston Post.
The Mountaineer.
The Montana Fruit Grower.
The Belt Valley Times.
The Big Timber Pioneer.
The Boulder Age.
The Avant Courier.
The Madisonian.
The Rocky Mountain Husbandman
The Darby Sentinel.
The Bozeman Chronicle.
The Helena Herald.
The Stock Growers' Journal.

EXPENSES.

There are no dormitories connected with the College. Students can find rooms and board in private families. Good homes can be provided for at very reasonable rates. Board and room may be had for fifteen dollars per month and upwards. Students may lessen expense by forming clubs.

Students are required to board in places approved by the Faculty.

ADMISSION.

Candidates for any class are examined in the studies of the lower classes. Students presenting certificates from accredited High Schools may be admitted without examination.

ATTENDANCE.

Prompt attendance at all recitations, lectures and regular exercises of the College is required of every student.

Students whose absences exceed five per cent. of the total number of recitations or lectures, in any subject, will not be allowed to take the regular examinations in that subject without first presenting a satisfactory excuse to the faculty.

EXAMINATIONS.

Frequent examinations are required of every student so that the standing of each student may be readily ascertained at any time.

Reports are mailed to parents at the end of each term.

ELECTIVE STUDIES.

A certain amount of latitude in selecting studies will be allowed to special students, although any departure from the regular prescribed courses will be discouraged as a rule. Students desiring to take special courses must first obtain the consent of the faculty.

DEGREES.

Suitable degrees and certificates will be conferred on graduates from all courses.

GOVERNMENT.

Students will be expected to conduct themselves as ladies and gentlemen; those who fail to comply with this demand will be requested to leave the institution.

Students must not leave the institution without reporting to the President. Any student transgressing this rule will be subject to suspension or expulsion.

ACCREDITED HIGH SCHOOLS.

The State Board of Education in a meeting held June 1, 1896, took the following action:

1. Candidates seeking admission to any of the regular courses in any of the State Educational Institutions must be at least sixteen years of age, and must possess a good moral character and good bodily health.

2. Accredited Schools.—Any high school or academy whose course of instruction covers the branches requisite for admission to one or more of the courses of any State Educational Institution may be admitted to its accredited list of preparatory schools, after a satisfactory examination by a committee appointed by the State Board of Education. Application for such examination may be made by any school board to the Secretary of the State Board of Education, whereupon a committee appointed by the State Board of Education will examine the course of study and methods of instruction of the school, and on the com-

mittee's favorable recommendation, and the concurrence of the State Board of Education, it will be entered upon the accredited list of the State Educational Institution for which it applied. Any graduate of such an approved school will be received by the President of the State Educational Institution wherein said graduate is entitled to enter, on presentation of proper diploma and certificate from the Superintendent of said school, into any of the courses of said institution for which said graduate has been fitted.

Students of an accredited school who are not graduates must expect examinations as other candidates.

A school once entered upon the accredited list will remain there until its administraton is changed, or until notice is given by the State Board of Education of unsatisfactory results. Upon a change of administration application for continuation upon the list, if desired, must be made. If the work of the principal coming into charge has been recently examined in connection with some other school, a new examination may not be required, but such examination should in all cases be invited.

Annual reports will be asked for by the State Board of Education from all accredited schools.

FEES AND DEPOSITS.

Preparatory, or any College Course, per year		$10.00
Physical Apparatus (deposit)		5.00
Qualitative Apparatus (deposit)		10.00
Quantitative Apparatus (deposit)		25.00
Assaying Apparatus (deposit)		25.00
Mineralogy, including Apparatus and 100 Minerals		5.00
Deposit for Material used in Shops	Course in Iron	5.00
	Course in Wood	3.00

At the end of the term the student may return such apparatus as has not been damaged and receive in return the balance of his deposit due him. This balance ought to amount to more than 50 per cent. of the original deposit.

DEPARTMENT OF MUSIC.

Fall Term—One lesson per week on Piano	$14.00
Winter Term—One lesson per week on Piano	12.00
Spring Term—One lesson per week on Piano	10.00
Total	$36.00
Fall Term—Two lessons per week on Piano	$25.20
Winter Term—Two lessons per week on Piano	21.60
Spring Term—Two lessons per week on Piano	18.00
Total	$64.80
Violin, etc., Two lessons per week, Per Term	$24.00

HARMONY.

Class lessons, $5.00 for the entire academic year.

Board and lodging may be obtained in the city for $4.00 per week and upward.

PAYMENT OF FEES.

All fees must be paid in advance. Students will not be permitted to enter classes until their fees are paid.

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